THE IRON TRADE REVIEW

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Domestic Demand Improving

And Many Companies Are Operating at Increased Rate—Sale of Block of Basic at Low Price—Finished Prices Firmer

Gradual increase in buying apart from demand for war materials is .being reflected in greater activity at mills and furnaces in firmer prices and a more confident feeling as to the future.

Railroad Buying

Numerous inquiries for rails for export are pending, but some of this business evidently has gone to British mills and definite information as to other tonnages is lacking. Domestic orders for rails are few and of small tonnage and there is almost no car buying. An extension of the Chesapeake & Ohio Northern, in Ohio, is to be made and an inquiry has been sent out for 2,100 tons of structural material. The Pennsylvania Steel Co. has booked 1,500 tons of bridge material for the Nickel Plate.

Machinery

The placing of orders for machine tools for export and for companies engaged in the manufacture of shrapnel in this country is not as important a factor in the machinery trade at present, but considerable war business is pending. Domestic demand not attributable to the war is showing some improvement and one notable inquiry is from the Burlington railroad, which is in the market for the largest list of machine tools sent out by any western railroad in many months. The demand for machine tools in the Chicago district shows improvement and Pittsburgh manufacturers are in a more cheerful frame of mind.

Pig Iron

The pig iron market in the Chicago district shows improvement in inquiry and sales and it seems probable that bookings will soon make a good total. The principal event of the week in the east was the placing of from 40,000 to 50,000 tons of basic by the Lukens Iron & Steel Co., at about $13.25, delivered. Shipments of pig iron throughout the country continue satisfactory. Statistics of the Eastern Pig Iron Association show that March was the fifth consecutive month to show a stock decline.

Prices

Leading sellers of plates, shapes and bars have made such progress during the past few days in establishing the 1.20c, Pittsburgh, price that it is expected that another advance of $1 a ton will be announced at an early date. Bars and shapes particularly are strong and cutting on prices of plates is not so frequently heard of.

Shapes and Plates

March lettings of structural material were the best in nine months, as shown by the statistics of the Bridge Builders' Society, whose shops were employed at about 64 per cent of capacity. Plate mills generally are operating at a very comfortable rate. One eastern Pennsylvania mill has been working at 85 per cent of capacity for several weeks and now has a large volume of orders on hand. Another order for a vessel has been placed with the Newport News yard and still another is about to be ordered.

Bars

The order recently taken by the Canadian Car & Foundry Co. for export calls for several million shells, of the value of about $80,000,000. A considerable part of the bar business has been sublet, as previously reported, but some remains to be placed. Reports of difficulty of American manufacturers in meeting the rigid specifications for shells are heard.

THE OPEN HEARTH

Not Playing the Hypocrite

SEVERE words of condemnation are being used nowadays by some foreign born Americans on account of the sale of large quantities of machinery and munitions by American manufacturers to nations now at war. For example, an editor, Marcus Brown, a Hungarian by birth, who resides in New York, said a few days ago, shortly after returning from a trip to Europe:

The people over there feel that America is playing the part of hypocrisy. They say our professed neutrality is but a hollow mockery. They told me we may proclaim our neutrality as much as we please, but as long as missiles bearing the unmistakable stamp U. S. A. are extracted from the maimed or dead bodies of their fathers, sons, brothers and sweethearts, this neutrality is but a pretense to allow a few manufacturers in America to enrich themselves.

This condition has stirred up a great deal of hostility in Germany toward the United States.

Probably all the manufacturers who are making shipments of war material would rather have business of other kinds. It isn't exactly comfortable to feel that one is making shrapnel to kill thousands of men, but we believe that all the criticism that is being indulged in is unjustified.

No one who has objected to the sale of war materials to the allies has succeeded in showing that the position taken by the department of state of the United States government is not thoroughly in accord with well established principles of international law, which permit a belligerent to procure munitions of war, with the exception of war vessels, from any neutral country and that a neutral country is not under the slightest obligation to prevent the export of such articles to any belligerent. The protest of the German government, in its note received at Washington last week, against the shipment of munitions is not well founded and the effort to establish a parallel between the present policy of the President and his action in preventing shipment of arms to Mexico can not succeed, for in the case of the troubled republic, conditions were very different and upon the President congress conferred special power which he does not possess in regard to the European war.

That the well established law of nations rests upon a solid foundation and is in harmony with the welfare and progress of the nations is clear.

If neutrals were not permitted to sell to belligerents, every nation would be compelled to depend on its own resources and could not buy any kind of material that could possibly be used in warfare. Such a policy would be in the highest degree unjust to peaceful powers, for it would give a great advantage to nations seeking war and would tend to compel peaceful nations to expend more than the world has ever witnessed in preparing for possible attack. A country remaining neutral and unprepared would be in a helpless condition. Suspension of sales to belligerents would, as recently pointed out by Prof. Gregory, dean of the department of law in the George Washington University, impose a policy of most strenuous militarism on all nations. "No nation could afford," says Prof. Gregory, "to be without complete supplies, adequate for war, always available within her borders. To be short in any essential might cripple her armies, lose her cause and ruin her government and her people. Her riches would be a bait, not a resource of defense."

Ex-President Taft has also pointed out that if the United States adopt the principle that neutral nations cannot rightly sell munitions to belligerents, and if other countries were to follow suit, the question would arise, In what position would the United States be left, supposing that hereafter it should suddenly be involved in a war with a well-prepared foreign state?

While to the superficial and sentimental observer the policy of manufacturers may not seem to be in harmony with strict neutrality, it is, in fact, the only policy consistent with real neutrality. The appearance of partiality to the allies is given because England controls the seas. That is the misfortune of Germany, for which certainly the United States cannot be

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blamed. If Germany controlled the seas, manufacturers would sell as freely to her as they now do to her enemies.

An Important Subject

THE letter to *The Iron Trade Review* from Charles S. Powell, of Cleveland, published elsewhere in this issue, deals with a highly important subject which is worthy of the attention of all manufacturers who are manufacturing war materials or are likely to do so. Mr. Powell depicts some of the thoroughly unsatisfactory conditions now characterizing this foreign business and declares that the present situation is a disgrace to the trade. Whether it would be possible for manufacturers to organize as he proposes without incurring governmental displeasure, we do not know. The subject certainly is worthy of investigation. If the agitation should have no other result, it would at least have the tendency to check manufacturers who, unless they are very careful, will become involved financially and perhaps in other ways.

Facts About Germany

THE well known author of the book entitled "The Manufacture and Properties of Iron and Steel", H. H. Campbell, in an article in *The Engineering Magazine* for March, on "Causes of Germany's Industrial Prosperity", calls attention to some important facts which will have direct bearing upon the relations of the United States and Germany after the end of the present great war. He says that one important factor in German industry is a bountiful supply of labor which is at once cheap, intelligent, skillful and manageable—qualities not often found combined. He says that in India, for example, labor is cheap and manageable, but is neither intelligent nor skillful; while in the United States we have labor that is intelligent and skillful, but it is not cheap and much of it is not manageable. Mr. Campbell speaks of a factory in Philadelphia which uses certain steel dies which before the war were imported from Germany. Since war was declared, these dies have been obtained in this country, but at a cost about 50 per cent more than that formerly paid the Germans. "It is easy to see," says Mr. Campbell, "what will happen when it is possible to resume business with Germany." The increased cost in America of making these dies is due very largely to the higher cost of labor. Mr. Campbell says that if we were comparing labor in this country with that of Hindu coolies or Jamaican negroes, we might talk about relative efficiency, but we cannot delude ourselves by any such thoughts when we are comparing our workmen with the machinists of Germany, who are intelligent, industrious, highly trained and generally efficient.

These facts and others relating to the wonderful progress of Germany should be looked squarely in the face by American statesmen and American manufacturers.

Prosperity and Predictions

THE persistence of expression of opinion by many people that the great war cannot last much longer is undoubtedly a factor in the increasing feeling of optimism which prevails in the business world. It is difficult, however, to find convincing evidence that the war cannot be continued for at least a year. Indecisiveness still characterizes the mighty struggle and unless there is an overwhelming victory in the east or the west within a few months, who can say that the fighting will not be continued indefinitely?

Another factor in the present situation is cheerfulness due to rosy reports sent out by officials at Washington. While all worthy efforts of the government to furnish authentic information are to be commended, it certainly is true that much of the optimistic talk at Washington is without solid foundation.

There is real improvement in many directions, but let us not invite a disastrous collapse at an early date by giving undue weight to predictions of early peace and assertions about wonderful prosperity.

Prices Present and Past

Quotations on leading products April 14, average for March, 1915, average for January, 1915, and average for April, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Apr. 14, 1915.	Average for Mar., 1915.	Average for Jan., 1915.	Aver. for Apr. 1914.
Bessemer pig iron, Pittsburgh..	$14.55	$14.55	$14.70	$14.90
Basic pig iron, Pittsburgh.....	13.45	13.45	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	13.70	13.80	13.70	14.15
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.00	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.50
Malleable, Bessemer, Chgo.....	13.00	13.00	13.00	14.25
Southern No. 2, Birmingham...	9.50	9.50	9.50	10.50
Southern Ohio No. 2, Ironton..	12.75	12.75	12.75	13.50
Basic, eastern Pa.....	13.25	14.00	13.50	14.25
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X foundry, Philadelphia..	14.25	14.25	14.25	15.00
Ferro mang., Balt., (prompt)...	100.00	100.00	68.00*	38.00
Billets, Pbgh.	19.00	19.50	19.50	20.80
Sheet bars, Pbgh.....	20.00	20.00	20.00	21.60
Steel bars, Chicago.....	1.39	1.34	1.29	1.33
Steel bars, Pittsburgh.....	1.20	1.10	1.10	1.15
Iron bars, Philadelphia.....	1.17	1.125	1.12	1.22
Iron bars, Cleveland, local del'y	1.20	1.15	1.15	1.20
Iron bars, Chgo. mill.....	1.15	1.10	0.98	1.15

*Nominal.

	Prices Apr. 14, 1915.	Average for Mar., 1915.	Average for Jan., 1915.	Aver. for Apr., 1914.
Beams, Chicago	$1.34	$1.34	$1.29	$1.35
Beams, Pittsburgh	1.20	1.15	1.10	1.18
Beams, Philadelphia	1.309	1.25	1.25	1.30
Tank plates, Pittsburgh.....	1.15	1.125	1.10	1.15
Tank plates, Chicago.....	1.34	1.34	1.29	1.32
Tank plates, Philadelphia.....	1.309	1.25	1.25	1.30
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.80	1.92
Sheets, blue an., No. 10, Pbgh..	1.30	1.30	1.30	1.40
Sheets, galv., No. 28, Pbgh....	3.40	3.40	2.77	2.92
Wire nails, Pittsburgh.....	1.60	1.60	1.51	1.60
Connellsville fur. coke contr....	1.65	1.65	1.69	2.00
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh.....	12.00	12.00	11.55	12.00
Heavy melting steel, east'n Pa.	11.00	10.50	9.50	11.50
Heavy melting steel, Chgo.....	9.25	9.75	8.87	9.50
No. 1 wrought eastern Pa.....	12.50	12.00	11.50	13.00
No. 1 wrought, Chgo.....	8.50	9.00	8.80	8.50
Rerolling rails, Chgo.....	10.00	10.00	9.50	11.25
Car wheels, Chgo.....	9.75	10.00	10.00	11.00

(For Additional Prices See Page 742.)

Basic Block Sold at Low Price

Lukens Iron & Steel Co. Buys 40,000 to 50,000 Tons—Shipments in Central West Satisfactory—Increased Sales at Chicago

Philadelphia, April 13.—Sharp price concessions accompanied the placing of 40,000 to 50,000 tons of basic by the Lukens Iron & Steel Co., for shipment through the third quarter, which represented the principal development of the iron market in this territory the past week. The price at which this business was divided between several producers was about $13.25, delivered. Most of the tonnage was taken by one seller. Before this sale, basic was quoted at $14, delivered, eastern Pennsylvania, but this was a purely nominal figure, as it was based on transactions consummated some weeks ago, since which there had been no business done in this grade. It is reported that the Lukens company may purchase some further tonnage. Along with the softening in basic, foundry prices have been a little easier in that down to $14.25, Philadelphia, for Northern No. 2X has appeared to be more freely obtainable on sizable lots. The foundry iron market apparently has become less firm as an aftermath of the recent Buffalo selling drive. Until that time, Northern No. 2X had been held more steadily at $14.50, Philadelphia, minimum. Trade in foundry irons is somewhat more active. A Lansdale pipe maker closed for 3,000 tons or more of No. 2 plain and lower silicon for third quarter. A Norristown, Pa., consumer took 1,000 tons and there have been a larger number of smaller orders. Some buyers who recently bought iron are again taking up the matter for further forward deliveries, apparently feeling that the present low prices are attractive. A Wilmington, Del., consumer asks 2,000 tons of foundry. Virginia iron continues a little more active at $12.50, furnace, for No. 2X. Sales of standard low phosphorus are lighter and makers are accumulating some iron at the furnaces. An inquiry for 3,000 tons of this grade for last half for the General Electric Co. is expected to go to the Lebanon district. A number of inquiries for low phosphorus have come out for Canada, but most of these appear to apply in various forms to the same business, a requirement of 1,200 tons. Low phosphorus prices are unchanged. A new export inquiry in this market calls for 4,000 tons of high silicon malleable. Shipments by eastern Pennsylvania merchant furnaces continue steady as shown by a further slight decline in stocks in March among the stacks represented in the Eastern Pig Iron Association. This is the fifth consecutive decline in stocks in as many months. There is further talk that one of the Brooke and one of the Crane furnaces soon may resume.

Scheduled to Blow In

Pittsburgh, April 13.—Clinton furnace, Pittsburgh, and Dover furnace, Canal Dover, O., are scheduled to blow in at early dates and it is not improbable another stack will be added to the active list in the Youngstown district within the next 30 days. Specifications for pig iron show slight increase in volume, but no large sales have been made and no important inquiries have been reported recently. Prices of steel making grades are unchanged. Foundry iron is being held at $12.75, valley, and above, although some iron has been sold on the basis of $12.50, valley, according to reliable reports. So far as can be ascertained, no additional iron for export has been obtained in this territory.

Melters More Active

Buffalo, April 13.—Signs of improvement among the foundries of the Buffalo district are becoming more and more pronounced. Melting interests that have been shut down and others that have been operating on fractional

(*For complete prices see page 792.*)

time are becoming more active, according to the demands beginning to be made upon the furnaces of the Buffalo district.

This improvement is noted in the sentiment of the consumers in the character and volume of the specifications coming in and also in the improvement in the demand for charcoal irons and the higher silicon grades.

While sales continue to be light after the big booking movement of a few weeks ago, a good quantity of iron under contract is being ordered out by the foundry interests. At least four local foundries report increased demands upon them for more or less general and not special casting work. One melter that conservatively contracted for a carload a week of iron ordered out a car on April 10, another on April 13 and has notified the furnace that it will need fully two cars a week, showing a doubled demand. Another consuming interest ordered out a car today that, under the contract, was not to have been forwarded until the middle of May. Numerous other instances can be cited of improved consumption.

An order for a good tonnage of foundry irons for second quarter deliveries had to be passed by several producing interests owing to their sold-up condition. Prices are now being held at $13 as a minimum for what available second quarter and third quarter iron can be booked. A price of $13 to $13.50 covers the various grades for deliveries up to last quarter. Some special iron, better than No. 1 foundry, has been placed during the week at $13.75. Little of the reported 60,000-ton inquiry of last week has been booked by the Buffalo furnaces.

Sales Better.

Cincinnati, April 13.—Two lots o 1,000 tons each of silvery iron have bee sold to Detroit melters for deliverie to extend into the second half. A inquiry for about 1,000 tons of souther foundry iron is pending from a loca melter, and 2,000 tons of southern iro will be bought by the American Stov Co., St. Louis, for its Bedford, O., plant The Laidlaw-Dunn-Gordon Co. will also buy 1,000 tons of southern iron for its local factory. Sales are usually smal and scattered, but the aggregate durin the past week has been much bette For example, a local house, that sol only 1,000 tons three weeks ago, sol over 5,000 tons last week. The activ ties in Wall street have also had good effect upon the market and th feeling in general is much improve Southern iron is holding at from $9.5 to $9.75, Birmingham basis, for No. 2 foundry, for first or second half deliveries, and southern Ohio makes are quoted at $12.75, Ironton basis, for No. 2 foundry, for delivery to the end of the year.

Basic Inquiry

St. Louis, April 13.—An inquiry from a local steel foundry for 10,000 tons of basic iron is about the most interesting thing that has occurred in this territory for some time. Sales last week were confined to small lots and very few of them, and with the exception of the inquiry from the steel plant, only car lots are asked for this week. Southern iron is quoted at $9.50 to $10, Birmingham. Northern iron continues to be held at $13, Ironton and Chicago.

Better Tone

Birmingham, Ala., April 13. — A better tone to the pig iron market is noted, there being one or two good-sized orders closed during the week, one of which was to a pipemaker, it is reported, at $9.50 for No. 2 foundry. The make during March has shown a steady gain over the previous two months and many iron interests believe that the improvement will continue.

An inquiry for 50,000 tons is reported in the Birmingham market, but the furnace interests state no deal has been closed.

Demand is Better

Chicago, April 13.—Considerably better inquiry and larger sales of northern foundry characterize the Chicago market. One seller finds his sales for the first half of April considerably better than for the entire month of March. Other sellers find sales increased in equal volume. Although foundry iron makes up the greater part of activity some inquiry is also current for malleable iron, totaling perhaps 5,000 to 6,000 tons. This is not sufficient to constitute real activity in the malleable market, but is an improvement over preceding conditions.

The inquiry for basic iron by a concern having a large plant near St. Louis has not been closed and probably will not result in a sale unless quotations are low, as the iron is not badly needed.

Indications are many that the melt in foundries is increasing as most of the sales are for immediate delivery and usually shipping instructions ask that the iron be hurried. Sellers of foundry coke also find that melters are anxious for increased shipments on their contracts.

Most merchant sellers are holding No. 2 foundry and malleable at $13, Chicago furnace, for immediate delivery and $13.50 for third quarter on the basis of an average of 2.50 silicon. Some business has been lost on these quotations, which is believed to have gone to a steel works furnace.

Southern iron is somewhat more active on a basis of $9.50, Birmingham, which appears to have become a settled price for the remainder of the year.

Inquiry Improves

New York, April 13.—Some betterment of inquiry and a more cheerful sentiment among buyers have been noticeable in the iron market in this territory the past few days. That some New England buyers, especially, still have tonnage to place after the recent Buffalo selling movement, is shown by inquiries just put out by one buyer there for 2,500 tons of foundry for shipment to begin at once and for 1,000 tons for another for June and later. The International Steam Pump Co., which was inquiring for 5,000 to 6,000 tons of foundry grades for several plants, has distributed this business. A lot of 2,000 tons of special iron was placed in this territory and another similar transaction is about to be closed. A railroad equipment shop remains out for 2,000 tons of high silicon iron for a western plant. Other smaller orders are moving. Export inquiries are numerous, but new orders are few, owing to the freight situation. An inquiry for 5,000 tons of a special grade has been put out by a consumer which has plants in this country and in the British Isles. Sweden has asked for 2,000 tons of foundry iron. A number of inquiries for low phosphorus for Canada aggregating 8,000 to 10,000 tons, are out, but it is believed some of these are duplication of the same business and that the actual quantity to be bought is much smaller. The large negotiation which the English government has had under way in this country has not reached a definite conclusion. Tidewater prices remain at $14.25 to $14.50 for No. 2X. Buffalo appears firm at $12.50 to $13, furnace.

Lewis A. Colvin, assistant superintendent of the iron foundry of James A. Colvin, Worcester, Mass., died at his home in that city, April 8, from heart disease, aged 50 years. He was a son of James A. Colvin, born in Danielson, Conn., and lived most of his life in Worcester, where he was always identified with his father's business. He was a member of the New England Foundrymen's association and widely known among the trade. He leaves a widow and two children.

(*For complete prices see page* 792.)

Pennsy Holds Its Scrap

Offers Made on Old Rails Not Satisfactory—Eastern Prices Hold in Absence of Disposition to Sell

Philadelphia, April 12. — Distribution of the 30,000 tons of old steel rails upon which it recently asked bids has been deferred by the Pennsylvania railroad. It is understood that over $11, delivered, along its line was offered by dealers for this material, but the offers were not acceptable to the holder. The New Haven also has deferred the award of a number of old locomotives representing about 4,000 tons. Light buying still characterizes the eastern Pennsylvania old material market, but as there also is not much disposition to sell, prices show small change. First grade heavy melting steel in small lots is bringing $11, delivered, eastern Pennsylvania. It is not likely, however, that sellers would accept a tonnage at this figure. A sale of 500 tons of cast, inferior in quality to No. 1 heavy, at $12, delivered, eastern Pennsylvania, attests the situation in this grade. Negotiations on scrap for export to Italy continue in an informal way, but have brought no results to date.

Scrap Quiet

Pittsburgh, April 13.—The iron and steel scrap market in western Pennsylvania continues to border on stagnation. Mills are increasing melts to a moderate extent, but they have not had to buy additional tonnages to meet demand. Heavy melting steel is hovering around $12. Other grades are marking time.

More Activity

Buffalo, April 13.—Dealers in the Buffalo district report the market more active. The principal demand seems to be for heavy melting steel, selling at $10.50 to $11 for the strictly No. 1 grade. Busheling and turnings have also experienced an improved demand in the past week or so, and the volume of business in turnings and borings is reported fair.

The yards of the Buffalo district seem to feel that the increased demand for a number of the lines is an indication that prices are soon to seek an improved level. No changes in prices are reported this week to warrant changes in quoted schedules, although some prices are slightly softer.

March Sales Best

Cincinnati, April 12.—Business transacted in the iron and steel scrap market in March was better and of larger volumn than for any month in the year 1914, or up to the present time in 1915. The month of April is expected to exceed March, because rolling mills are fast using the surplus of old materials stored in their yards, and will soon be in the market for new supplies. Jobbing foundries are busy on machinery castings, but are buying from hand to mouth. Heavy melting steel is best in demand, and good sales are also being made on bundled sheet scrap, No. 1 machine cast, cast borings and machine shop turnings.

Scrap Market Lifeless

Chicago, April 13.—With large consumers out of the market, dealers find no outlet for their material and the market is nominal. Quotations are aproximately the same as those announced last week, as practically no trading has taken place to establish a different level. Both rolling mill and steel grades are unusually quiet with large stocks in the hands of users and increasing accumulations in the yards of dealers.

Railroads continue to offer considerable tonnages, the Southern Railway having a list out for about 4,500 tons, the Union Pacific 3,000 tons and the Michigan Central for 1,675 tons. The C., St. P., M. & O. closed its list of 1,100 tons April 12.

Weak at St. Louis

St. Louis, April 12.—The scrap market continues weak with prices unchanged. Transactions for the last 10 days have been few, but the feeling improved somewhat with the close of the week.

Railroad lists out this week are: Missouri, Kansas & Texas, 1,000 tons, of which 150 tons are long length steel rails and 220 tons No. 4 steel rails; Cincinnati, Cleveland, Chicago & St. Louis, 4,000 tons, of which 1,000 tons are long length steel rails and 250 tons No. 1 railroad wrought; Southern Railway Co., 4,450 tons; Chicago, Minneapolis & St. Paul Railroad 1,150 tons; Toledo, St. Louis & Western, 100 tons.

Reports of Large Sales

New York, April 13.—Reports are in circulation in the old material market of large sales of steel scrap having been made to Italy, subject to the obtaining of freight room, which are in addition to the recent taking of 15,000 to 20,000 tons of crop ends from eastern mills for that country, previously noted. One report has it that an engagement of 30,000 tons of heavy steel has been made depending upon freight arrangements. Italy has been in the market steadily in recent weeks for large blocks of steel and other grades as a shortage of old material is said to exist in that country. The scrap market in this district remains quiet, with prices steady. Heavy melting steel in eastern Pennsylvania remains at $11, delivered. Pittsburgh is offering less for heavy melting steel or $11.75, delivered, equivalent to $9, New York. There is some movement of heavy cast and stove plate. A recent lot of 3,000 tons of rapid transit steel in Brooklyn, was placed at a shade below $9. The material is to be picked up by the buyer.

Quiet at Cleveland

Cleveland, April 14.—The iron and steel scrap trade is watching the movement in the stock markets with a great deal of interest as an index of the business outlook, and in the meantime are not making especial commitments in any direction. Sentiment, while not really good, is better than a week ago, and brokers are less inclined to believe that scrap prices may react to lower levels. Cleveland mills are all taking in material in moderate quantities, but little new buying is being done. Although valley mills are operating at a fair rate they are in the market for little scrap at present. Prices are unchanged.

(*For complete prices see page 792.*)

Bolts On Better Basis

Chicago, April 12.—Quotations on nuts and bolts are much more uniform and prices seem firm. Specifications are being received in larger volume and are much better than earlier in the year with agricultural implement makers and others coming more actively into the market. Demand for rivets continues much below capacity of makers and prices are nominal.

Held More Firmly

Pittsburgh, April 13.—With steel bars gradually being advanced to higher levels, nut, bolt and rivet makers are holding prices of their products more firmly. There is not much snap to the market, although makers report a slight improvement this month.

A paper on "Recent Developments in Cast Iron Manufacture" by J. E. Johnson Jr., consulting engineer, New York, which appeared in the January and February issues of the *Journal* of the Franklin Institute, has been reprinted in pamphlet form for general distribution.

Steel Bar Specifications

Are Being Received in Better Volume from Agricultural Implement Concerns and Other Consumers

Philadelphia, April 12.—Small sales of steel bars on immediate specifications at 1.20c, Pittsburgh, or 1.359c, Philadelphia, have been done in further instances in this territory the past week and additional contracts for second quarter also have been closed at that figure. The new price apparently has gained further ground and now seems steady. There has been some additional inquiry from the manufacturing trade for third quarter and makers have been quoting 1.25c, Pittsburgh, for that delivery. Specifications have been lighter, as many consumers ordered in freely during the closing days, against their lower first quarter contracts. Some negotiations for rounds for shrapnel and lydite shells are going on, but no further orders are reported. The Cumberland Valley railroad is about to place a fair tonnage of reinforcing bars for its new bridge at Harrisburg.

Bar Demand Heavier

Chicago, April 13.—Specifications against contracts for steel bars are being received in better volume at present than at any time since the first of the year. This flood of specifications is coming from all sources, no particular line being more active than others. Agricultural implement makers and general manufacturers are specifying against their contracts in a gratifying way. No new buying has taken place, as practically all users of importance are covered by contracts running until the middle of the year and further new business scarcely can be expected unless an unexpected boost in general business occurs shortly.

Bars are steady at 1.39c, Chicago mill, and no shading is coming to light.

Bars Head List

Pittsburgh, April 13.—Steel bars are stronger than either plates or shapes and makers do not expect to have difficulty in maintaining the present price, 1.20c, for this quarter. The Carnegie Steel Co., the Republic Iron & Steel Co., the Cambria Steel Co. and the Jones & Laughlin Steel Co. are well provided with orders. Practically all makers have been engaged in the manufacture of rounds for shrapnel shells. Agricultural implement makers are beginning to send out definite inquiries for needs after July 1, but mill managers seem to prefer to await developments.

Demand for Munitions

New York, April 13.—Principal interest in the steel bar market continues to center in the heavy requirements for rounds or forgings which are coming out as the result of the large contracts for shrapnel and lydite shells and other forms of ammunition for the European countries at war. Some large orders for bars and forgings have been closed with the mills in this country as the result of the enormous order for shrapnel and shells for the Russian government recently taken by the Canadian Car & Foundry Co. and sublet to various companies in this country, President Curry, of the Canadian company, in New York last week, announced the value of this order is $80,000,000. Several million shells are involved in the order. Some steel tonnage for this order still is to be placed. The American Locomotive Co. as yet has taken no action in distributing the steel required for a large shrapnel order, for which it has closed except for final details. Other steel tonnages for ammunition orders are under negotiation. There is not a wide activity in the regular channels of the steel bar market. Makers, however, continue to close second quarter contracts and some immediate business at 1.20c, Pittsburgh base, or 1.369c, New York, and the market shows stability at that level.

Bar Iron Quiet

Chicago, April 13.—Makers of iron bars find buyers are not deeply interested, and only sufficient tonnage is being received to continue operations on a five-day-a-week basis at best. Prices are not softened by the decreased demand and 1.15c, Chicago, continues to be the asking price, with no difficulty in obtaining contracts at that level from anyone who wishes iron. Inquiry is not brisk and the market apparently is drifting.

Shafting Advanced

Pittsburgh, April 13.—Cold rolled shafting has been advanced $1 a ton by some makers, who now are quoting 68 per cent off for prompt or future delivery. The advance had been expected, as a result of increased prices for steel bars, but all makers have not yet withdrawn the 69 and 70 per cent off figures. Hoops are being quoted at 1.30c, but that figure is shaded $1 a ton when desirable tonnages are involved. Bands are named at 1.20c.

(For complete prices see page 792.)

Coke Market

Exhibits More Life as Furnaces Prepare to Blow In

Pittsburgh, April 13.—Connellsville coke oven operators appear more hopeful. Shipments have gained to a moderate extent and it is believed production figures will show a satisfactory increase this month. The Pittsburgh Steel Co. continues to negotiate for fuel for shipment after July 1. Clinton furnace, Pittsburgh, which requires about 12,000 tons of fuel a month, may be blown in at an early date, and preparations are being made to apply the torch at Dover furnace, Canal Dover, O. Another blast furnace in the Youngstown district may be added to the active list this month. Spot furnace coke shows moderate strength, expressions being heard that desirable coke is not obtainable at less than $1.55, ovens. Contract fuel is obtainable at a spread from $1.65 to $1.75, ovens. Consumers of foundry coke have not yet showed more than passive interest in the market for delivery after July 1, when most contracts for 72-hour coke expire. The Connellsville *Courier*, for the week ending April 3, says production in the upper and lower regions was 281,251 tons, a decrease of 3,986 tons compared with the week before.

Sale of Furnace Coke

St. Louis, April 12.—One local sales agent reports a sale of 5,000 tons of furnace coke the middle of last week. The inquiry for coke is not worth talking about, and prices remain at $2.25 to $2.50 for foundry grades.

Shipments Good

Cincinnati, April 12.—Specifications to forward shipments of foundry coke are better, as jobbing foundries are now busy on machinery castings. Very few requests to withhold deliveries are being received on either furnace or foundry coke, except when a furnace is blown out. New contracts are very scarce, being at a minimum on foundry coke, as yearly contracts for this grade are not usually made until some time in June. The only furnace coke sold in this territory for a long time was about 40,000 tons of Pocahontas grades last week, which will supply a Virginia stack for six months. No changes in prices are reported from either the Pocahontas, New River or Wise County fields.

Youngstown Sheet Mills

Are Operating at Full Capacity—Secession Movement from Amalgamated is Checked

Pittsburgh, April 13.—The Creek mill of the Whitaker-Glessner Co., Wheeling, W. Va., resumed operations Monday morning, leading observers to believe the secession movement at that plant has been checked for the present. Owners of the mill had told employes they would not resume operations until after the revised wage schedule of the Amalgamated Association had been accepted. The Martins Ferry mill of the company is still idle. La Belle Iron Works, Steubenville, O., has announced a reduction in wages of 11 per cent to sheet mill men, to take effect April 16.

Sheet mills in the Youngstown district are operating at maximum capacity. The Brier Hill Steel Co. continues to operate at 100 per cent of capacity, and the Youngstown Sheet & Tube Co., and the Youngstown Iron & Steel Co., are producing from 75 to 90 per cent of capacity. The American Sheet & Tin Plate Co. is operating tin mills at about 95 per cent capacity; its sheet mills are running at about 69 per cent. Galvanized steel sheets have reflected slight improvement the last few days, due to the advance in spelter, but some material continues to be offered at 3.30c for No. 28 gage. Black sheets appear firm at 1.80c and blue annealed at 1.30c for base size gages.

Demand for tin plate is heavy. Mills are operating at maximum capacities and indications are that present rolling schedules will be maintained until the close of the season. Foreign shipments are heavy, but no new orders for export are noted this week.

Little Change is Shown

Philadelphia, April 12. — Week to week changes in sheets with eastern Pennsylvania makers continue unimportant. If anything, the movement is a little better at present, though lately it has been somewhat spasmodic. Pacific coast buying still is in abeyance due to the unsettled transcontinental rail rate and the higher ocean freights through the Panama canal. Prices are unchanged at 1.459c to 1.509c, Philadelphia, or 1.30c to 1.35c, Pittsburgh, for No. 10 gage, blue annealed.

Prompt Sales Only

Cincinnati, April 12.—Mills continue to quote galvanized sheets for prompt shipment only because of the uncertainty of the price of spelter, which has again advanced about three-quarters of a cent in the past few days. Black sheets are being sold to extend into the second half at present quotations, which are from 1.85c to 1.90c, Pittsburgh basis. Galvanized sheets are quoted today at 3.40c to 3.45c, Pittsburgh basis. Sales are fair, but are being held back because of the refusal of mills to sell galvanized sheets on extended contracts. The Newport Rolling Mill Co. is operating all of its mills day and night, and the same is true of the American Rolling Mill Co., Middletown, O.

Sheet Market Uninteresting

Chicago, April 13.—Sheet makers find little business offering and the condition resulting from the high price of spelter seems to interest users of galvanized plates much less than had been expected. While nominal quotations of 3.59c, Chicago mill, are being made, it is evident that the equivalent of 3.30c, Pittsburgh, can be done in some quarters. The decline of spelter from its high point has made possible a slightly lower price on the part of some makers for heavier gages where the proportion of zinc to steel is lower. Not much inquiry is active for galvanized and for black and blue annealed no change has taken place in demand or price.

Plates Stronger in East

Where Bookings Are Heavier and Mill Activities Greater—Demand Light in Central West

Philadelphia, April 12.—Expanding bookings and more active operations remain more generally observable among eastern Pennsylvania plate makers. One important mill has been averaging an 85 per cent output for the past six weeks and is reported to have accumulated bookings which match its capacity for the next three or four months. Other makers are doing almost if not quite so well. Tonnage continues to come in from many miscellaneous sources with railroad work light. There is a good volume of marine steel as further new boat contracts are being let. One additional vessel was placed by the Mallory line the past week and another is virtually settled. Specifications against recent sales of ship plates to the British Isles now are being received by eastern Pennsylvania makers. The Central Iron & Steel Co. is the low bidder on 650 tons of tank plates for Panama, its figure being about 1.12c, Harrisburg. More contracts for second quarter plates have been taken by eastern Pennsylvania makers at 1.20c, Pittsburgh. The market seems firmer in price over a week ago, but shading for desirable prompt specifications continues.

More Vessel Orders

New York, April 13.—Further orders for new vessels have been placed the past week with eastern ship yards. The Mallory Steamship Co. practically has closed with the Newport News yard for a boat to replace the Denver, lost recently at sea, but some final details of this contract yet remain to be settled. In addition to this contract, another vessel is on the verge of being closed with an eastern builder. A third boat referred to a week ago practically as closed, but regarding which details were withheld, it proves is for the A. H. Bull Steamship Co. and the award has gone to the Maryland Steel Co. The plates, 2,000 tons or more, for this boat, will be furnished by the Cambria Steel Co. These new contracts make a total of four announced during the past two weeks and bring the grand total of awards to eastern yards during the past three or four months, to 27. There is more volume to the plate market with miscellaneous orders predominent. Prices are firmer and the range of quotations now is from 1.319c to 1.369c, New York, or 1.15c to 1.20c, Pittsburgh.

Plates Steadier

Pittsburgh, April 13.—The Carnegie Steel Co., the Jones & Laughlin Steel Co. and other important plate makers in this district are refusing to shade 1.20c for second quarter shipment, and that figure appears much firmer than a week ago. With possibly one or two exceptions, all mills in this district are adhering to that figure. Talk of an advance of $1 a ton for third quarter is heard frequently.

(For complete prices see page 792.)

Plate mills are not well provided with orders and no large tonnages have been placed here this week in the open market.

Competition on Light Plates.

Cleveland, April 13.—On heavier plates, the 1.20c quotation, Pittsburgh, seems to be maintained pretty well, especially in the immediate Pittsburgh district, but on light plates, competition is active and 1.15c, Pittsburgh can be done without difficulty.

Plates Are Dull.

Chicago, April 13.—Makers of steel plates find demand for this product continues much less than that for bars and shapes, and rumors of low prices further east have been heard. However, specifications on contracts made for plates at 1.34c, Chicago, are being received, which indicates that shading in the east has not had an effect on the market in this territory. There is comparatively little new business and most makers are holding quotations at 1.39c, Chicago mill.

Forging Steel

In Good Demand—Bessemer Billets Sold in the East

Philadelphia, April 12.—An eastern buyer has taken 1,000 tons of 4 x 4-inch bessemer billets from a middle western mill at better than $20, Pittsburgh. There has been some further tonnage of billets for export sold by makers in this territory. Forging steel continues active due to the demand for forgings for machine tools and ammunition contracts. Rolling billets for the domestic trade show only modest movement. Prices in this district are unchanged at about $22 to $22.50, Philadelphia, or $19 to $19.50, Pittsburgh, for rolling and $3 to $4 higher for forging billets.

Semi-Finished Moving

Pittsburgh, April 13.—Sheet bars are being offered at $19, Youngstown, for shipment this month by a couple of makers, and that figure seems to represent the bottom of the market. At least one mill is asking more for bessemer than for open hearth products, but price differentials are not general. Billets are commanding $19.50 and above at Pittsburgh; whether they are obtainable at Youngstown for less than $19 is doubted by some. Specifications against contracts are liberal, but no new buying of consequence is reported. Muck bar is nominally listed at $27, Pittsburgh. Wire rods are quoted at a spread from $25 to $26, Pittsburgh.

Shape Prices Seem Firmer

With the Larger Mills Adhering to 1.20c, Pittsburgh, Even in Eastern Territory

New York, April 13.—March's showing in structural lettings, as was expected, was the best in nine months, or since July, 1914, according to the announcement of the official monthly figures. With some additional tonnage, which was closed in the month but was not listed in the total, pending the signing of final contracts, the month's record would have been the best since April, 1914. March bookings of all shops in the country, according to the statistics of the Bridge Builders' and Structural Society, amounted to 64 per cent of full capacity, or approximately 110,000 tons. This is more than double the showing in February, with 30 per cent and 51,000 tons, respectively.

Report of Bridge Builders

The reports of the Bridge Builders' society, showing the percentage of capacity contracted for monthly and the approximate tonnage for each period is as follows:

Month.	Per cent.	Approx. tonnage.
March, 1915	64	110,000
February	30	51,000
January	25	43,000
December, 1914	35	60,000
November	20	35,000
October	35	60,000
September	38½	65,000
August	27½	48,000
July	68	115,000
June	56½	95,000
May	57	97,000
April	88	151,000
March	76	130,000

New business in structural steel in the metropolitan district the past week has been in lighter volume. New inquiry is only fair. Financing difficulties still block the materialization of various projects. About 14,000 tons of new subway and elevated work are in the market and bids were taken in the week on another section, about 5,000 tons. News has reached this district of some larger inquiries for bridge and building work in other centers. Bids have been asked on the approaches to the large St. Louis free bridge over the Mississippi river, requiring 24,000 tons. The main portion of this structure already has been built. The new building to be erected at Pittsburgh by H. C. Frick, 5,000 tons, is out, as well as sizable lots of bridge work for the Missouri, Kansas & Texas, Chesapeake & Ohio Northern and other roads. The new price for plain material of 1.20c, Pittsburgh, has made some progress toward firmness, but certain eastern mills still are shading on desirable specifications. This, however, more generally is being held to about $1 a ton, or to 1.309c, New York.

Shape Prices Seem Firmer

Philadelphia, April 12.—Indications of a firmer price condition in structural shapes are reported from various districts tributary to the eastern Pennsylvania mill center. The larger mills appear to be standing firmly by the new price of 1.20c, Pittsburgh, or 1.359c, Philadelphia, for second quarter contracts and also are naming this figure on prompt specifications. Eastern Pennsylvania makers quote 1.20c, Pittsburgh, on contracts, but will go to 1.15c, on desirable orders for early delivery. Some of the eastern buyers in the most preferred class, because of their tonnage, also are reported to have been covered at considerably below 1.15c, on their second quarter needs. The tone of the market continues better and deals, as heretofore, largely with prospective work of which the volume is promising. Small orders are more numerous, though the tonnage expands slowly in this district. Eastern Pennsylvania mills are running better, but not gaining very much at present. The Pennsylvania railroad has taken bids on 650 tons of elevated crossing work in the Kensington district in this city. This is an isolated contract, however, and probably is not the beginning of the extensive program of similar work, for which this road has prepared plans. A 3,000-ton office building at Baltimore is up in tentative form.

Shapes Improved

Pittsburgh, April 13. — Structural shapes reflect some improvement. More important manufacturers are refusing to shade 1.20c for second quarter delivery, and that figure seems to represent the market at this center. Structural shape and plate mills need additional tonnages, but not badly enough, it appears, to offer concessions.

Shapes More Active

Chicago, April 13.—A somewhat better tonnage of structural shapes was closed last week, the larger number of the projects and the larger tonnage going to the Pacific coast. In keeping with the campaign of Pacific coast states to keep as much business as possible in their own territory, most of this tonnage was placed with fabricators located in Cal-

(*For complete prices see page 792.*)

ifornia. The largest item was practically 2,500 tons for a brewery in San Francisco, which was taken by a San Francisco fabricator.

CONTRACTS AWARDED.

Rainier Brewery Co., San Francisco, plant, 2,480 tons, to Judson Mfg. Co., San Francisco.

West Lake Street Bridge over the Pan Handle Tracks, Chicago, 767 tons to Chicago Bridge & Iron Co.

Western Fuel Co., Crane Runway, Oakland, Cal., 560 tons, to Mead-Morrison Mfg. Co.

Natomas Consolidated of California, dredge hull, 450 tons, to Johnson Brothers.

Capital National Bank, bank and office building, Sacramento, Cal., 386 tons to Palm Iron Works.

George D. Dayton, garage, Minneapolis, 140 tons, to American Bridge Co.

Post Office building, Gary, Ind., 113 tons, to Gage Structural Steel Co.

Additional buildings for the Bridgeport Arms Co., Bridgeport, Conn., 1,400 tons, now learned recently awarded Pennsylvania Steel Co.

Grandstand for National Baseball park, Boston, 800 tons, awarded New England Structural Co.

Draw-span for Atlantic coast line, Tampa, Fla., 250 tons, awarded Phoenix Iron Works.

Bridge for Lehigh valley railroad at Reniff, N. Y., 425 tons, awarded Pennsylvania Steel Co.

Section four of route four and 36 of the Broadway-Fourth avenue subway line, New York City, 4,860 tons, general contract awarded Litchfield Construction Co.

Public school No. 197, Borough of Queens, awarded to an independent shop.

CONTRACTS PENDING.

Lehigh Valley Railway Co., new passenger terminal, Buffalo, bids opened in New York City April 14. Large tonnage structural.

Section No. 2 of route 12 of the Eastern Parkway subway line, Brooklyn, 12,000 tons, bids to be taken April 20.

Five small sections for Manhattan elevated railway improvements, New York City, 2,100 tons, bids being taken.

Approaches to free public bridge over Mississippi river at St. Louis, 24,000 tons, bids being taken. Main structure already completed.

Frick building, Pittsburgh, 5,000 tons, bids being taken.

Grade crossing elimination work at Allegheny avenue, Philadelphia, for Pennsylvania railroad, 600 tons, bids being taken.

Tin shop for the Frankford arsenal at Philadelphia, 200 to 300 tons, bids being taken.

Bridge work for the Chesapeake & Ohio Northern railroad for new Ohio line 2,100 tons, bids being taken.

Bridge work for the Missouri, Kansas & Texas railroad, 2,000. tons, bids being taken.

Stock pens for the Pennsylvania railroad at Herrs island, Pittsburgh, 150 tons, bids being taken.

Office building for Consolidated Gas & Electric Co., Baltimore, 3,100 tons, preliminary figures asked.

Approaches to bridge at Jacksonville, Fla., for the Atlantic Coast line, tonnage not stated; bids being taken.

The Werra Aluminum Co., Waukesha, Wis., established about 18 months ago by Conrad Werra, formerly general manager of the Manitowoc (Wis.) plant of the Aluminum Castings Co., is working on an overtime schedule with a force of more than 225 skilled operatives to meet the unusual rush of new business. Other Waukesha industries allied with the automobile trade are working beyond normal, the Waukesha Motor Co. having at this time the largest force it has ever employed.

Wire Mills

Are Operating at Almost Full Capacity—Prices Firm

Pittsburgh, April 13.—The Jones & Laughlin Steel Co., the Youngstown Sheet & Tube Co., the Pittsburgh Steel Co. and the Cambria Steel Co. are operating wire departments at practically maximum capacities, and the American Steel & Wire Co. is blowing seven of its nine blast furnaces. Specifications for shipments abroad involve heavy tonnages in the aggregate and fairly good demand for domestic shipment is reported. The $1.60 price for nails has not been severely tested, but is being quoted on new business.

Swamped With Orders

Buffalo, April 13.—Agencies here report that the mills are swamped with orders. One large producing interest in the valley is said to be operating on a 110 per cent basis at present, with deliveries extended to 30 days and over. Prices are being held firmly at 1.40c, base, on plain wire, and 1.60c, base, on nails. A good share of this business is said to be for export business, not for war material, but going into general use in India, China, Australia, Japan, South America and other markets more or less cut off from placing their requirements in Europe on account of the war.

Operating at 90 Per Cent.

Cleveland, April 13.—The American Steel & Wire Co. is operating at about 90 per cent of capacity and its shipments are going forward very satisfactorily. Independent companies also report satisfactory business and find difficulty in some cases in making deliveries prompt enough to satisfy customers. Prices are well maintained

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Institute Will Move

The offices of the American Iron and Steel Institute at New York City, which for the past five years have been located in the Hudson-Terminal building, 30 Church street, will be removed on April 29 to the new Adams Express Co. building, 61 Broadway. A suite of rooms on the 29th floor will be occupied.

(For complete prices see page 792.)

Rail Orders

Come Very Slowly—Results of Pennsylvania Experiments

New York, April 13.—Experiments by the Pennsylvania railroad, with its new specifications for steel rails, requiring the cooling of the bloom and subsequent reheating before the final passes, it is learned, have shown practically no change in the quality of the steel in the finished rail, as compared with the ordinary practice where continuous rolling of the hot bloom is followed. This was the result that generally had been expected by railmakers. In all, 6,000 tons of rails were rolled, according to the new specification, and the test, except for a few last points, has been completed. Interest among railmakers now is centered in the release of the remaining 160,000 tons of the Pennsylvania's season's rail order, but there is no certainty when this will be distributed.

Except for export tonnages, the rail market is quiet. The Norfolk & Western is expected to buy 4,000 tons additional, but has not put out an inquiry as yet. The 9,400 tons for the South Australian government has been placed, presumably, with British mills. The Bolivian government asks 6,000 tons. Of the recent 38,000-ton inquiry for South Africa, 8,000 tons remain open, the main order, as previously stated, having been credited to the Dominion Iron & Steel Co. The 10,000 tons or so for the British Isles still is pending. There is considerable buying of girder rails. The Pennsylvania Steel Co. has taken 1,200 tons for the Bay State Railways.

Car and locomotive orders continue poor. The Baldwin Locomotive Works has taken two switching engines for the Lehigh & New England railroad, two for the Standard Oil Co. and one for the Chestnut Ridge railroad and also one consolidation locomotive for the Mt. Hope Mineral railroad, Mt. Hope, N. J.

Bridge Material Award.

Cleveland, April 13.—The 1,500 tons of bridge material for the Nickel Plate, on which a Cleveland shop figured, have been awarded the Pennsylvania Steel Co. The Chesapeake & Ohio Northern has sent out an inquiry for 2,100 tons of structural material for bridges on the line to be built from Sciotoville, O., to Waverly, O. Tenders are to be received April 23. Railroad business, so far as cars are concerned, is very dull and one railroad has adopted a policy of curtailment in regard to car repairs.

Great Clamor in England for Steel

Consumers Find Great Difficulty in Getting Semi-Finished Material—

Pig Iron Prices Continue to Advance

Office of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., April 2.

The absence of any decisive or dramatic news from the seat of war enables the nation to concentrate its attention more strongly on the industrial problems connected with the gigantic conflict. It is increasingly evident that a huge output of ammunition and war material is called for. The industrial responsibility is the heavier, because our factories have to feed the Russian and French guns, as well as our own.

Pig Iron Higher

This has been one of the most important weeks in the pig iron industry since the war commenced. Prices have gone forward by leaps and bounds. In the Cleveland market there has been a rise of 5s ($1.20) on the week. This has given an impetus to brands in other districts, and at Birmingham yesterday advances of almost equal amount were reported for Northamptonshire, Derbyshire and Staffordshire pigs. A remarkable fact in connection with these advances is that makers are as thoroughly dissatisfied as buyers, and there are many complaints that contracts booked a short time ago, at prices expected to carry a fair margin of profit, have already involved a loss. This is partly due to the enormous prices of coke. Yesterday sellers were asked 28s ($6.72) per ton, a price more than double the figure asked for in normal times. When to this are added railway congestions and delays, daily threatening the furnaces with stoppage, and frequently compelling them to go on slack blast, it will be readily understood how margins of promising profit take to themselves wings and fly away. The scarcity of coke is partly due to the very high prices offered for coal, which incline the colliery owners to sell their fuel in raw state, rather than send it to the coke ovens. On the South Wales market, special foundry cokes are realizing 41s ($9.84) to 43s ($10.32), good foundry 36s ($8.64) to 40s ($9.60) and furnace coke from 28s ($6.72) to 32s ($7.68).

The rise in best iron reported elsewhere has affected best cold blast, which is now quoted at 135s ($35.40). The ironstone miners in the north of England are working today (Good Friday) so as to keep the furnaces supplied. At Cleveland, the warrant stock has increased during the month by 5,000 tons and now stands at 129,000 tons. In spite of submarine terrors, there has been a little improvement in shipments and freights are slightly easier. The huge demand for steel has brought northeastern hematite up to the record figure of 105s ($25.20), and it is claimed that some material very urgently wanted has realized 110s ($26.40). Makers are able to get almost any price they like from needy customers. In the northwest district, the demand is more pressing than ever, with an increased proportion of special metal. Quite half of the make of the district consists of special hematites, chiefly for protection for warships, armored trains, war motors, etc. Outside Cleveland every pound of iron produced is going into consumption.

Finished Iron and Steel

Advances have taken place in almost every description of material during the week. Best Staffordshire iron generally known as marked bars have been advanced 10s ($2.40) making the basis price £10 ($68.00) with £10 12s 2d ($51.00) for the Earl of Dudley's brand. This represents a rise of £1 10s ($7.20) since the war began. Nobody would have been surprised if the advance had been greater, and it is clear that higher prices cannot long be delayed. South Staffordshire common bars and gas strip are also substantially higher and, as usual, slit nail-rods share the best iron advance and go up to £10 ($48.00). Several other advances have taken place in productions of minor importance.

The great clamor is for steel. There is hardly any British semi-finished steel on offer, and consumers are scrambling for supplies. Some firms are scarcely able to get material on any terms. The nominal quotation for English billets is £7 5s ($34.80) but some sales have been made as high as £8 ($38.40).

There was a very significant action in the law courts this week brought by a very large buyer of billets, the District Iron & Steel Co., Smethwick. Just before the war, the firm bought several thousand tons of steel billets from a London merchant, in a large way, at £4 ($19.20) per ton. It was understood that the steel was to come from Germany. The war, of course, stopped this source of supply, and the contract could not be fulfilled. The buyer had to go to a Leeds steel works and instead of buying at £4 ($19.20) he had to pay £5 10s ($26.40). The claim upon the merchant was for the difference. The court held, as most people expected, that this was merely a war incident, for which the merchant could not fairly be penalized. The action places in a strong light the enormous difficulties British users of steel have to encounter through the absence of foreign supplies, associated with the great demands for steel for shrapnel and other war purposes. We are looking to America to solve the problem whenever easier freights bring your steel fairly into the market.

As far as general demand is concerned, business is overwhelming. Enormous contracts from private buyers have had to be refused this week owing to the great and increasing requirements of the government. Sheffield is at present needing at least 1,500 more skilled men to turn out war material, and a great deal more stuff could be produced, if the men could be found. Meantime works are being enlarged and adapted, and men are being trained as rapidly as they can be obtained.

The tinplate trade continues to improve, and the increased cost of steel has compelled an advance in prices. Output, however, is being carefully regulated, and production is being restricted to 60 per cent of capacity.

Both the Northern and Midland wages boards have issued their bi-monthly returns this week. While production has been heavier, the rise in prices during January and February was too slight to carry an advance in wages. Nobody doubts that the next returns will be very different in this respect, and that both prices and wages will show a very decided increase.

Clarence A. Earle, for the past year vice president and assistant manager of the Hendee Mfg. Co., Springfield, Mass., has become general manager in place of George M. Hendee. Mr. Hendee will continue as president, but the change means that he will be relieved of many of his duties, inasmuch as the detail of the operating no longer will be handled by him. Robert W. Ellingham, who has been works manager three years, has resigned and his position has been abolished. Theron L. Loose has been promoted to the office of general superintendent.

Ferro Shipments

Will Be Continued, It Is Expected—Pledges Being Signed

New York, April 13.—No arrivals of ferro-manganese for the general trade in this country under the recently inaugurated resumption of shipments from England have come in, but advices all point to a round tonnage now being loaded or dispatched. The next two or three weeks probably will see the arrival of a number of boats carrying this alloy to apply upon the recently merged contracts of consumers. The names of three of these vessels carrying these shipments already have been given. Additional boats which will bring in lots of varied size during the next several weeks are the Dominion, the Quernmore and the Chancellor. Consumers with contracts now are signing freely the additional written pledges to the English government and are delivering them to the special representatives of the latter at New York. So the preliminaries for the distribution are being arranged satisfactorily.

Persistent reports have been in circulation recently that buyers with a good tonnage would have no difficulty in shading the official price of $78, seaboard, subject to the ability of the sellers to ship. Apart from the "marrying up" of a few straggling tonnages at this figure and some new sales of small quantity, very little business has been done at the $78 figure. Most of the contracts were merged at $68, seaboard, before the advance in the price was posted by English makers. It is understood that on sizable new orders, $78, seaboard, can be shaded with certain sellers, at least. Ground ferro-manganese is easier on the improved prospects of producers receiving new metal within the next few weeks. Where the market recently had been 7 to 7½ cents per pound at the plant, 6 cents per pound now has been done.

It now is learned that certain large steel interests, some weeks ago, were the purchasers of round blocks of domestic spiegeleisen. There is a prospect that further large tonnages may be closed by steel makers as the latter more freely have been adopting this alloy in their practice to conserve their supplies of ferro-manganese. Domestic 20 per cent spiegeleisen recently has been quoted $25 to $27, furnace, but it is learned the minimum figure was shaded sharply on some of the large business closed.

Quiet at Pittsburgh

Pittsburgh, April 13.—The alloy market offers little of interest. Ferro manganese consumers, reasonably assured that material will be shipped at frequent intervals, do not appear concerned either about the present or the future. Inquiries are confined to small lots for prompt delivery. Fifty per cent ferro-silicon is in fair demand, but no new buying of consequence is enjoyed. Lower grades of this alloy are selling at low figures, it being easy to obtain No. 12 per cent at $19, furnace. Spiegel shows some irregularity; it nominally is quoted at $27, furnace, but sales have been made at $1 a ton under that figure. Ferro-tungsten and ferro-molybdenum show some activity, but prices are not steady. Vanadium is listed at a range from $2.25 to $2.75 per pound of contained vanadium. Ferro-carbon titanium is named at a spread from 8c to 12½c per pound, according to the size of the tonnage involved.

Crane Award

Will Probably Be Made Wellman-Seaver-Morgan Co.

Washington, April 14. (By wire.)—It is reported from a reliable source that Admiral Watt, industrial manager of the Norfolk, Va., navy yard, has returned the specifications and bids for the 150-ton floating crane to Secretary Daniels with the recommendation that the award be made to the Wellman-Seaver-Morgan Co., the lowest bidder. The secretary is said to have submitted the specifications and bids, along with the recommendations, to the bureau of construction and repair, which is expected to give approval to the recommendation, with the result that the award will be let within a few days.

New Iron Tube Discounts

Pittsburgh, April 13.—Several iron boiler tube manufacturers are now quoting 3½ to 4½-inch at 63 per cent off in less than carload lots, with no preferential discounts. The discount offered by the last previous cards, issued early in January, 1914, was 60 per cent off for carloads, with rather generous preferential discounts provided for buyers of desirable tonnages. The market for steel and iron boiler tubes is quiet. Talk of an advance in the price of galvanized steel pipe is heard. Demand for standard steel and iron pipe is described as satisfactory, but the market for oil country goods is quiet and uncertain.

A. F. Huston, president of the Lukens Iron & Steel Co., Coatesville, Pa., has returned from Florida.

(*For complete prices see page* 792.)

Heavy Shipments

Made by Corporation Last Month—Unfilled Orders Decrease

For the first time in four months, the order book of the Steel Corporation suffered some reduction during March, when a loss of 89,622 tons was shown in the statement issued at New York, March 10. This reduction previously had been indicated by the heavy rate of shipments that had been maintained throughout March and had averaged better than 70 per cent of total capacity. The orders on hand March 31 were shown to be 4,347,371 tons compared with 4,434,993 tons on Feb. 28. The order book still is more than 1,000,000 tons ahead of its position at the low point of Nov. 30, 1914. The changes in unfilled tonnage beginning July, 1910, when the first report was made, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Mar. 31, 1915....	4,255,749	89,622—	2.06—
Feb. 28, 1915....	4,345,371	96,800+	2.28+
Jan. 31, 1915....	4,248,571	411,928+	10.74+
Dec. 31, 1914....	3,836,643	512,051+	15.40+
Nov. 30, 1914....	3,324,592	136,505—	3.94—
Oct. 31, 1914....	3,461,097	326,570—	8.62—
Sep. 30, 1914....	3,787,667	425,664—	10.01—
Aug. 31, 1914....	4,213,331	54,742+	1.32+
July 31, 1914....	4,158,589	125,732	3.12+
June 30, 1914....	4,032,857	34,697+	0.86+
May 31, 1914....	3,998,160	278,908—	6.98—
Apr. 30, 1914....	4,277,068	376,757—	8.09—
Mar. 31, 1914....	4,653,825	372,615—	7.42—
Feb. 28, 1914....	5,026,440	412,760+	8.95+
Jan. 31, 1914....	4,613,680	331,572+	7.74+
Dec. 31, 1913....	4,282,108	114,239—	2.59—
Nov. 30, 1913....	4,396,347	117,420—	2.60—
Oct. 31, 1913....	4,513,767	490,018—	9.79—
Sep. 30, 1913....	5,003,785	219,683—	4.24—
Aug. 31, 1913....	5,223,468	175,888—	3.03—
July 31, 1913....	5,399,356	407,965—	7.03—
June 30, 1913....	5,807,317	517,005—	8.18—
May 31, 1913....	6,324,322	654,440—	9.38—
Apr. 30, 1913....	6,978,762	490,194—	6.55—
Mar. 31, 1913....	7,468,956	187,758—	2.45—
Feb. 28, 1913....	7,656,714	170,654—	2.18—
Jan. 31, 1913....	7,827,368	104,796—	1.32—
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502+	3.40+
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sep. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206,296+	3.46+
July 31, 1912....	5,957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56,363+	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942,806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sep. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,163+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sep. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

The Lockhart Iron & Steel Co. has installed a universal mill for rolling bars up to 12 inches wide and also heavy forgings. The company recently completed the installation of new equipment in its power house and has added a modern testing laboratory and a large warehouse for stock to its facilities.

Ore Booklets

Show a Number of New Ores Listed by Cleveland Firms

The 1915 booklet giving complete average cargo analyses of Lake Superior iron ores has been issued for the season of 1914 by Secretary Tinker, of the Lake Superior Iron Ore Association. A number of the booklets of Lake Superior selling agencies for 1915 giving analyses for 1914 have also come from the press.

In the booklet of the Lake Superior Iron Ore Association, in which in previous years one Crow Wing ore was listed, there are now four grades of Crow Wing ore, *a b c* and *d* listed, according to the manganese content, which runs from 20.718 natural in Crow Wing *a* to 9.033 in Crow Wing *d*. These are ores of the American Manganese Mfg. Co. The analysis of Kennedy ore appears for the first time, as do also those of Aurora No. 1 and No. 2, now the property of the Inland Steel Co.

The Hill ores are listed by M. A. Hanna & Co., Cleveland, under the names of Leonard, Marcus and Jerome. The Jerome ore is a mixture from the Harold, North Uno and Leonard group of mines; the Marcus is made up from the Smith, Leonard and Dunwoody group of mines.

Oglebay, Norton & Co. have listed as new ores the Quebec, a granular red hematite, from the Ottawa mine on the Gogebic; the Judson and Camden, red hematites from the Menominee range, and the Knox, a coarse hematite from the Mesabi.

Pickands, Mather & Co. list the following new mines: Old range bessemer, Isabella, Pewabic, South Chandler and Toledo; old range non-bessemer, Balkan, Cedar and Snyder; Mesabi bessemer, Mace.

E. N. Breitung & Co. are offering the same ores in 1915 as in 1914, as is also the Shenango Furnace Co.

Two washed ores are offered for the first time, La Rue by M. A. Hanna & Co. and Crosby by the Cleveland Cliffs Iron Co.

Proposed Chain of Plants

Chicago, April 13.—Edward N. Hagar, formerly president of the Universal Portland Cement Co., who is engaged in forming a new cement company, has given out the following interview relative to the purposes of his new organization:

"The company will be capitalized not in excess of $25,000,000, with a possible minimum of $20,000,000. The stock will be all of one class. There will be no bonded indebtedness. Should the company require additional extensions in the future, that will be provided out of the earnings. The object of the company is to establish a chain of plants over the country. These plants will be obtained by purchase where practicable, or by building where necessary.

"In order to avoid any complication with the government or infringement of the terms of the Sherman anti-trust law, any plants which I may purchase will be non-competing. It is my desire and intention to operate in strict conformity with the laws of the United States and the various states in which we may operate."

Metal Trades

Association Holding Its 17th Annual Convention in New York

New York, April 14. (By wire.)—The seventeenth annual convention of the National Metal Trades Association was called to order at the Hotel Astor this morning by President Herbert H. Rice, who is slated for the unusual honor of being re-elected to the presidency. The morning was occupied by reports of officers and standing committees, and after a buffet luncheon, the report of the committee on prevention of industrial accidents, by W. H. Van Dervoort, chairman, was taken up for consideration.

The convention banquet will be held this evening and the final session of the convention will be held Thursday morning.

Meetings yesterday were the administrative council meeting, the secretaries' breakfast and the joint luncheon of local presidents, secretaries and administrative councils. The alumni dinner was held last evening.

Early History of "Safety First" Movement

In many quarters it is believed that the "Safety First" movement is of comparatively recent origin. Many manufacturers, however, have been engaged in safety work for over 15 years. The Crane Co., Chicago, was one of the pioneers in safety work, particularly as regards eye protection. In 1897 this company commenced to furnish goggles to its men and in 1898 began giving the glasses to the workmen free of charge. From the outset every effort was made to encourage the men to wear the glasses constantly when they were exposed to flying metal, emery dust, glare, etc. Dr. A. M. Harvey, who was at that time and still is chief surgeon for the Crane Co., was the originator of the plan to provide men with the glasses without expense. As a result of this policy, the number of eye injuries has been greatly reduced.

Threat

To Disrupt Entire Situation Was Not Mentioned

Washington, April 13.—At the hearing yesterday before the interstate commerce commission in the intermountain rate case, discussion was devoted exclusively to the proposals of carriers for making rates to the so-called back haul on commodities embraced in schedule C-2. This schedule, which, among other things, includes iron and steel articles, represents 75 per cent of the tonnage shipped to the Pacific coast and western interior points. No reference was made to the fact that the Southern Pacific and its subsidiary, the Morgan steamship line, and the Santa Fe are threatening to disrupt the entire situation. The South Pacific-Morgan line is understood to have published rates, now under suspension, to greatly reduce those established by the commission on traffic from New York to the Pacific coast. The Santa Fe is said to be prepared to meet any rates the Southern Pacific may make from New York.

Valuable Papers to be Presented

Several papers of interest to the iron and steel trade will be read at the meeting of the American Institute of Electrical Engineers, to be held at the Fort Pitt hotel, Pittsburgh, April 15 and 16. The meeting will be held under the auspices of the Pittsburgh section of the national organization.

After an address Thursday morning by Paul M. Lincoln, president of the institute, R. H. McLain will read a paper on "Industrial Control in the Foundry". A joint luncheon will be enjoyed at noon with the Pittsburgh Jovians, which will be followed by a paper on "The Civic Responsibilities of the Engineer", by Morris Knowles. Two papers will be presented at the afternoon session, one on "Mill Controllers", by H. F. Stratton, and the other on "Steel Mill Controllers From the Operator's Standpoint", by James S. Riggs.

Dr. John A. Brashear will give an informal talk on "Reminiscences of Scientific Discoveries", after a 6 o'clock dinner. A theater party will be enjoyed Thursday night. Papers to be presented at the session Friday are as follows:

"Control of Direct-Current Hoists in Iron and Steel Mills", by E. G. Stoltz and W. O. Lum; "Direct Current Control for Hoisting Equipment", by W. T. Snyder; "Alternating Current Controllers for Steel Mills", by Arthur Simon, and "The Alternating Current Hoist", by Raymond E. Brown.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

Charles E. Carpenter, of the Allied Machinery Co. of America, New York, has left for a business trip to Europe.

Charles G. Gorsuch has been elected president of the Savage Mountain Fire Brick Co., Frostburg, Md. John A. Caldwell is treasurer and manager.

C. M. Schwab has resigned as a director of the Lehigh Valley Traction Co. and has been succeeded by E. G. Grace, president of the Bethlehem Steel Co.

Charles Warnock has been made manager and treasurer of Robert W. Hunt & Co., Ltd., Montreal, to succeed Charles C Whittier, who has been transferred to the Chicago office.

Walter D. Carnes, who has been connected with the New York office of the Lima Locomotive Corporation, has been transferred to the Chicago office of that corporation.

Charles M. Clarke and Francis W. H. Clay, counselors at law and patent attorneys, recently have moved their offices from the Frick building to the Oliver building, Pittsburgh.

H. T. Barber will look after the interests of the stamping department of the Transue & Williams Co. of Alliance, O., in the Michigan territory. His office is located at 915 Ford building, Detroit.

H. F. Baldwin was unanimously elected president of the A. Baldwin & Co., Ltd., New Orleans, La., at the recent annual meeting of the board of directors. G. B. Baldwin is secretary and treasurer of the company.

E. G. Grace, president of the Bethlehem Steel Co., was a guest of honor at a dinner of the alumni of Lehigh University held at the Machinery Club, at New York City on April 8. Mr. Grace is a trustee of the University.

Arthur L. Aldrich, second vice president of the Shaw Motor Co., Sauk City, Wis., has been promoted to the first vice presidency. The concern recently established permanent works at Sauk City, removing to that place from Chicago.

Carl F. Dietz, assistant sales manager of the Norton Co., Worcester, Mass., has been promoted to the position of sales manager to fill the vacancy caused by the resignation owing to ill health of Edward W. Dodge, for 24 years in the employ of the company.

J. A. Post von der Burg and C. Y. Bruss, both of Rotterdam, Holland, are on a visit to machine tool manufacturers in the United States for the purpose of placing orders for machinery. They were in Worcester, Mass., recently looking over various factories.

William F. Cole, general manager of the Baldwin Chain & Mfg. Co., Worcester, Mass., is on a trip to the Panama-Pacific exposition at San Francisco.

John A. Caldwell, Frostburg, Md., has been elected president of the Potomac Fire Brick Co., Piedmont, W. Va. M. A. Patrick is vice president and W. F. Caldwell, manager. This is a new concern owning its own clay lands and coal and having bright prospects.

W. D. Crawford was re-elected president of La Belle Iron Works, Steubenville, O., at a meeting of the board of directors recently. Other officers re-elected were: H. E. Westfall, vice president; R. C. Kirk, secretary and treasurer; Gerry Le Van, general manager.

W. F. Davis, superintendent of the bessemer department of the Cambria Steel Co., Johnstown, Pa., now has charge of both the bessemer and open hearth departments. C. A. Alexander, former head of the open-hearth department, is engaged in special work for the company.

Prof. H. J. Thorkelson, professor of steam and gas engineering of the University of Wisconsin, has been elected business manager of the university to fill the vacancy caused by the resignation of Dr. H. C. Bumpus, who became president of Tufts College in Massachusetts last year.

A. W. de Revere is now in charge of the Chicago office of the Terry Steam Turbine Co., in the People's Gas building. The company has also opened an office in the Michigan Trust building, Grand Rapids, Mich., in charge of A. L. Searles, to cover the southern peninsula of Michigan.

C. J. Stock, Middleton, England, has disposed of his interest in the Stock Oil Fired Converter Co. and has been appointed English representative of the Snyder Electric Furnace Co., 53 West Jackson boulevard, Chicago. Mr. Stock's office will be at the Villas, Middleton, St. George, Durham, England.

President J. H. Plummer, of the Dominion Steel Corporation, states that the export trade is improving not only in respect to war munitions but in general lines. While the domestic rail business is dead, the corporation has obtained some small orders from abroad. It is now working at 70 per cent of capacity.

The Goldschmidt-Thermit Co., 90 West street, New York, announces it has appointed Anton Lucas as its representative in Kansas, Missouri and adjacent states. Mr. Lucas will make his headquarters at Kansas City but as he will spend the greater part of his time in his territory, it is suggested that mail for him be sent to the New York office of the company.

A. E. Holcomb, of Chicago, Ill., has accepted the position of chief engineer and designer for the Rood Mfg. Co., Grand Rapids, Wis., dredging and excavating machinery and drainage and irrigation equipment. Mr. Holcomb assumed the new duties April 1. For several years he has acted as general manager and chief engineer of the Chirago branch works of the Clyde Iron Works, Duluth.

George Harper, Chicago, has been appointed general superintendent and works manager of the Burlington Brass Works, Burlington, Wis., to succeed W. B. Crawford, resigned. Mr. Harper has been associated with the company for many years as general traveling representative. Mr. Crawford succeeded the late Samuel Jacobsen as manager, and resigned to engage in a similar line in the east, his former home.

John W. Higgins, treasurer and general manager of the Worcester Pressed Steel Co., Worcester, Mass., has been re-elected president of the Worcester branch, National Metal Trades association. He was elected a member of the administrative council of the National association at New York, last week, for a two years term, succeeding John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass.

John W. Harrington of the Harrington & Richardson Arms Co., Worcester, Mass., is on his second visit to Europe since the outbreak of the war. He was in Paris last summer when war was declared and had a series of adventures including trips to the firing lines and witnessing the firing of bombs from aeroplanes over the city. His business this time is in connection with war orders his company has received. His stay is indefinite and after passing two weeks in England he plans to go to France, where he will stay with friends in Paris for a while.

Spelter Prices Advancing

Strong Export Demand Promises to Continue—Copper Quotations Moving Up Rapidly

New York, April 13.

The spelter market, after a period of uncertainty, has hardened and prices again are advancing in quite the same sensational manner as they did early in the year. Sales of spot prime western were made today at 10c, St. Louis. Demand the past week has been active, especially from abroad. The business which has been booked from abroad recently has easily been at the rate of 10,000 tons of spelter exports per month, which figure conservative producers regard as the minimum of the export demand as long as the war lasts. The foreign demand comes from England, Russia and Japan mostly and involves all grades. The delivery called for generally is May and June, and the prices done on this business have been around 9c to 9.25c, St. Louis, for prime western, and 11c, New York, on brass special. A feature of interest in connection with this foreign demand is that the London market today advanced to £44 10s. In addition, good-sized sales have been made to galvanizers; these interests are inquiring actively on May and June, and many of them need April. The situation is exceedingly strong; high grade is practically sold up till October; brass special is almost entirely sold up through June and producers of prime western are well sold ahead. Sellers now are quoting about as follows on prime western: 9.87½c to 10c, St. Louis, for spot; 9.50c to 9.62½c, St. Louis, for April; 9.37½c to 9.50c, St. Louis, for May; 9.10c to 9.25c, St. Louis, for June, and 9c to 9.15c, St. Louis, for July. A strengthening development last week was the publication of the government's long-delayed spelter report. This report predicted great strength in the market for the duration of the war, and especially during the rest of this year.

The aluminum market continues firm. The domestic producer is holding prompt shipment at 19c to 19.25c, Niagara Falls. Practically the only other seller is the importer of British aluminum, who offers futures at 19.50c, duty paid, New York. There were some sales of imported aluminum recently at 18.50c, Chicago, but no more spot imported now is available.

Copper is advancing by leaps and bounds as a result of the big war demand. Electrolytic now is held at 16.37½c to 16.50c, delivered 30 days, although a few small lots probably could be picked up at less. Casting copper is offered at 16c to 16.12½c, delivered 30 days. The best brands of lake copper have sold at 17.50c, cash. On ordinary brands 16.75c, cash, is asked and on arsenical brands 16.37½c, cash. Demand for lake is especially active. Production of copper now appears to be at least 90 per cent of normal.

Foreign demand for lead recently has been of large proportions and producers are well sold ahead. Some producers, in fact, are out of the market temporarily.

The antimony market is quiet, but strong, by reason of the scarcity of supplies. Cookson's has sold in small lots at 33c and only a few casks are left. On United States and H. H. French antimony about 28c, duty paid, is asked. On spot Chinese and Japanese 22.50c to 23c, duty paid, is asked, while shipment from the far east is offered in limited tonnages at 19.25c to 20c, in bond.

The nickel market is exceedingly strong. Not only is there a continued active demand from the steel industry, and from cupro-nickel manufacturers, who have booked big war orders, but there is a big demand from countries which formerly relied on Austria and Germany for their supplies. There is practically only one seller. Ingots, shot and cubes are quoted at 42c per pound in lots of 5,000 pounds or more, while on electrolytic nickel 3c per pound higher is asked.

The tin market in this country temporarily is all out of joint by reason of the new policy which Great Britain has put in force in regard to the metal. Not only does that government now refuse to permit any exports of tin to neutral countries, except such as are consigned to British consuls at the ports of destination, but it develops that importers here, in order to get the release of the tin after it has arrived, have to sign guarantees that the tin has been sold, and also have to give assurances that it will not be re-exported in any form to any country with which Great Britain is at war. The working-out of this scheme naturally would do away with the spot market since there could be no free re-selling of tin. In view of this situation, there naturally is scarcely any business in tin and quotations are almost entirely nominal. Spot is around 57c to 58c. Offers on futures are about as follows: April, 50c; May, 40c; June, 39c. Arrivals so far this month total only 305 tons.

Cast Pipe

Prices in East Tend Upward—Dull in the West

Chicago, April 13.—Unusual dullness has characterized the cast iron pipe market in the west for the past week. Cities appear to have lost interest in their requirements and even contractors' jobs are not as plentiful as had been the case for several weeks. Bids will be opened at Peoria Heights April 19 on 1,000 tons and at Stronghurst, Ill., April 15 on 250 tons.

J. B. Clow & Sons have been awarded 238 tons at Jackson, Mich., and the United States Cast Iron Pipe & Foundry Co. has taken 700 tons of 36-inch pipe at Cincinnati.

Upward Tendency

New York, April 13.—More decided tendency of eastern shops to advance their prices on cast iron pipe continues to be the most interesting development in the market. There is a practically uniform movement upward on quotations and makers are showing more determination to hold for these figures, as they are in a more independent position on bookings, especially on smaller pipe. Some of the more important producers now are holding 4 to 6-inch pipe at $22 to $22.50, tidewater, or an advance of $1.50 to $2 over the recent low point. One maker, however, still is active at low prices. The volume of the market is satisfactory and the undertone more encouraging. Public lettings are not numerous or heavy, but private buying is well maintained. There is more activity in pipe for export. A private letting for about 1,500 tons of 3 to 15-inch for delivery near Havanna, Cuba, is up. The lot of 450 tons of 12-inch for Argentine, remains before sellers, as well as the 10,000-ton inquiry for Canada, which still is of an indefinite and rather mysterious character, and the foundries are in doubt as to what will develop from it. R. D. Wood & Co. have taken 1,800 tons of 20's for St. John, New Brunswick. The Donaldson Iron Works has received 140 tons of 4's to 8's for Bloomfield, N. J., at $22.80, delivered, for the 4's, and $21.10 for 6's and 8's, and 190 tons of 6's and 7's for Arlington, Mass. New York City is out for 300 tons of 6's to 14's; Taunton, Mass., for 285 tons of 6's to 12's, and Quincy, Mass., for 200 tons of 6's to 10's, all for April 14.

Over Seventy

Is Present Rate of U. S. Steel Corporation Activity

New York, April 14. (By wire.)—An encouraging tone to the general finished situation continues to be reported in practically all lines, but buying is still conservative. The reception by the trade of the new 1.20c price is pleasing to mills and this figure is hardening.

In some products the increase in specifications is marked. Foreign business is moving well, but government restrictions cut tonnage to some countries, particularly to India and Australia.

The United States Steel Corporation is operating at over 70 per cent. New business with this producer is slightly less. The new benzol plant to be built at Ensley will have an annual capacity of 4,000,000 gallons and will be ready in October. About $2,000,000 remain to be spent at Duluth and it is expected this plant will be completed next spring.

Use of Oil

As Fuel in Foundries Discussed at Newark Meeting

The regular monthly meeting of the Newark Foundrymen's Association, held at the Washington restaurant, Newark, N. J., on April 7, was addressed by W. N. Best, 11 Broadway, New York. Mr. Best discussed the use of oil as a fuel in foundries, and spoke with particular reference to the drying of molds in steel foundries, and to the use of oil in melting brass. In order to make the best use of oil as fuel, said Mr. Best, it is necessary that the oil be thoroughly atomized, that the supply of air for combustion be just sufficient to admit of complete oxidation, and that the combustion chamber of the furnace be so constructed as to admit of perfect combustion.

Mr. Best discussed the type of burner which he recommends for use in oil-burning installations and he described the different features of furnace design. He advised that a heat-recording instrument be used with each installation, saying that he knew of one company, operating 12 mold-drying ovens, which saves 1,000 gallons of oil per month over its former record, by making use of such instruments. Mr. Best advised against the use of direct-fired oil furnaces in brass foundries, saying that although they operate economically, they waste much metal through fusion. He recommended the use of oil-fired crucible furnaces, saying they admit of more accurate melting to analysis, and waste less metal. He described a six-pot furnace of what he called the reversible type, in which the heat is applied alternately at each end, thus retaining much of the heat which otherwise would go to waste.

At Once

Construction of Benzol Plant at Fairfield, Ala., Will Begin

Birmingham, Alabama, April 12.—Announcement has been made by President George Gordon Crawford, of the Tennessee Coal, Iron & Railroad Co., that construction will begin at once on the new benzol plant to be erected by his company at Fairfield, where the wire mill of the American Steel & Wire Co. is located. The plant will be of a capacity to recover from the by-product gases 13,000 gallons of benzol every 24 hours.

The Thomas A. Edison company is now constructing a benzol plant at the Woodward Iron Co.'s plants at Woodward, the capacity of which will be 2,000 gallons of benzol each 24 hours. The two plants thus make an output of 15,000 gallons of benzol which will be a new product for the Birmingham district.

J. R. Lemoine, president of the United States Cast Iron Pipe & Foundry Co., has been visiting Birmingham for the past several days, in connection, it is understood, with the additions to be made to the company's plants at this place. As previously announced, the company will expend $100,000 or more in enlarging its local pipe-making plant.

Pig iron makers have been interested in President Lemoine's visit, as he usually leaves one or two pig iron orders behind him after a visit to Birmingham.

The American Casting Co., manufacturer of cast iron pipe for railroad culverts, will resume operations after a close-down of several months. The plant is located at East Birmingham. It is stated that enough orders are on hand and it is believed enough business will develop to warrant continuous operations from now on.

W. R. Walker, assistant to James A. Farrell, president of the United States Steel Corporation, is spending a few days in Birmingham, coming here from St. Louis.

Jose Garcia Jove, Rio de Janeiro, Brazil, is on a visit to the United States to promote South American trade.

Discussion

Under Five Minute Rule at Institute Meeting in May

Preliminary announcement is made of the titles of several of the papers, with their authors, which will be presented at the eighth general meeting of the American Iron and Steel Institute at the Waldorf Astoria, New York City, on May 28. One or two other papers will be added to the program, but the plan has been adopted to make the list at this meeting shorter than heretofore and to encourage informal discussion of the various subjects under the five-minute rule.

Some of the papers to be presented are as follows: "Blast Furnace Advancement," by Andrew E. Maccoun, superintendent, Edgar Thomson blast furnaces, Carnegie Steel Co., Braddock, Pa.; "Modern Merchant Steel Mills", by Jerome R. George, chief engineer, Morgan Construction Co., Worcester, Mass.; "Corrosion of Steel", by Daniel M. Buck, chemist and metallurgist, American Sheet & Tin Plate Co., McKeesport, Pa.

At the banquet in the evening, the principal address will be given by Dr. Lloyd Noland, superintendent of the health department of the Tennessee Coal, Iron & Railroad Co., describing and illustrating the welfare work of that company.

Old Stories Warmed Over

Pittsburgh, April 14. (By wire.)—Daily newspaper dispatches referring to the placing of large orders for shrapnel and war material for belligerent European nations in this district refer to contracts placed some time ago. Some of them, in fact, already have been completed. As previously reported by *The Iron Trade Review*, the Westinghouse interests, including the Electric & Mfg. company, Machine company and the Air Brake company, are working on large orders which necessitated extensive machine tool purchases. The Air Brake order is said to involve an expenditure of $20,000,000. The Firth-Sterling Steel Co., the Pressed Steel Car Co., the Oil Well Supply Co., the Heppenstall Forge & Knife Co., the Carbon Steel Co., the Carnegie Steel Co. and the Jones & Laughlin Steel Co. have been furnishing material.

The Essex Glass Co., Mt. Vernon, O., will build a $45,000 plant at Dunkirk, N. Y., on property adjacent to the Lake Shore railroad. Work on the buildings will be started at once.

Investments in Iron River District

Description of Operations in This Field, With Particular Reference to Welfare Work for Mine Employes and Their Families

BY C. A. TUPPER

WHILE iron ore mining methods and equipment will be discussed in this article, it also will consider the humanitarian aspects of management, as the dividends on investments in men undoubtedly are quite as certain as returns from machinery.

In the Iron river district of Michigan, at the south end known as Palatka, the Verona Mining Co., a subsidiary of Pickands, Mather & Co., Cleveland, operates the Baltic, Fogarty, Caspian and Bengal mines, which lie from southeast to northwest in the order named. Chas. E. Laurence, general superintendent, Palatka, is in charge of all the company's operations on the Menominee range.

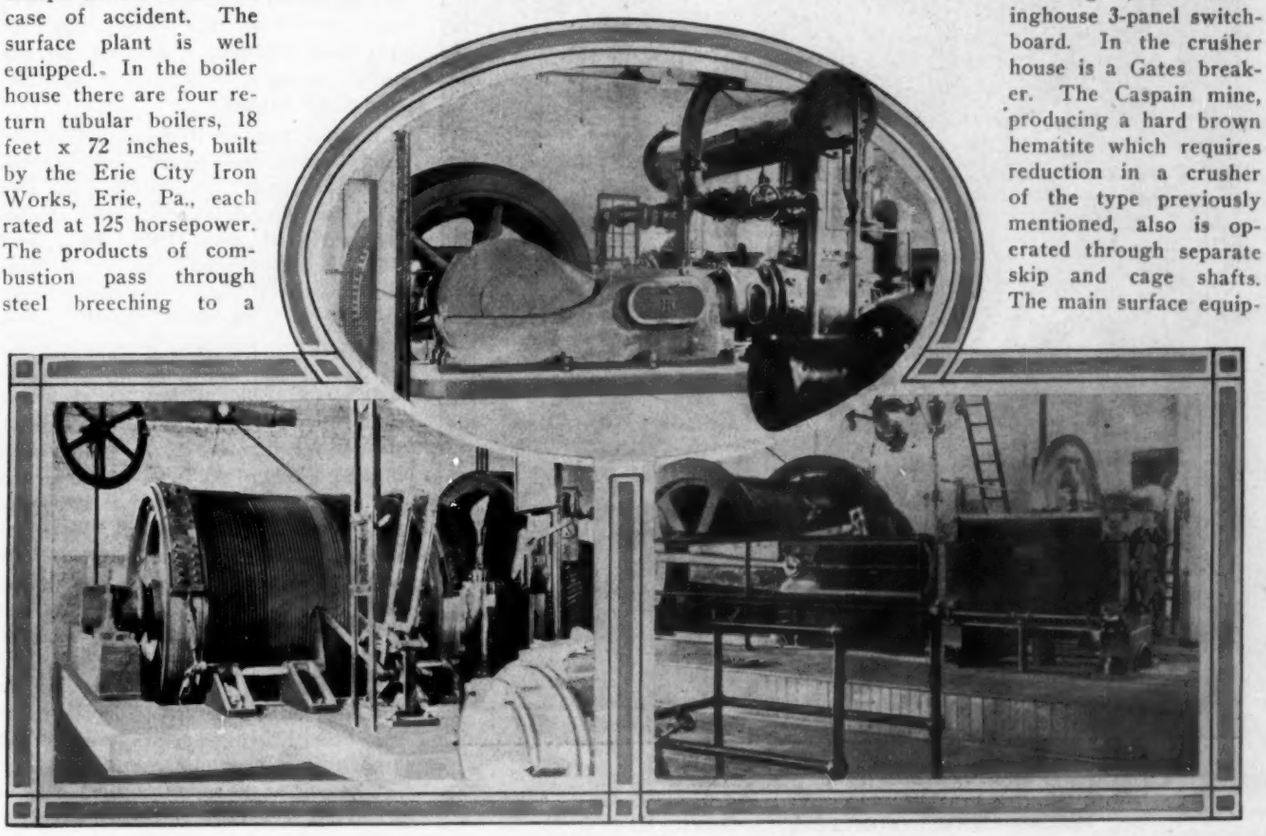
The ore at the Baltic mine is a brown hematite and is mined by the sub-level stoping system. There are two shafts, one being used for hoisting ore and the other for men and materials. This arrangement facilitates ventilation and provides a means of escape at either end in case of accident. The surface plant is well equipped. In the boiler house there are four return tubular boilers, 18 feet x 72 inches, built by the Erie City Iron Works, Erie, Pa., each rated at 125 horsepower. The products of combustion pass through steel breeching to a large, high, steel stack set in a masonry foundation. Feed water is supplied through a heater by two Prescott 7 x 4½ x 10-inch pumps.

The engine room contains a two-stage Ingersoll-Rand compressor with air cylinders 32 and 20 inches by 42 inch stroke, a Wellman-Seaver-Morgan hoist and electrical equipment. The latter includes a Westinghouse 70-kilowatt, 250-volt direct current generator, running at 875 revolutions per minute, which is driven by a Ball engine, and a Westinghouse switchboard with controlling and recording apparatus.

This mine, which was the pioneer in the Palatka field, having made its first shipment in 1901, is opened to the seventh level, a depth of 685 feet. The ore, on arrival at the shafthead, is first dumped over grizzlies, dividing fine and lump. The latter goes to an engine-driven Gates breaker in which it is crushed, dropping into railway cars for shipment in summer, and in winter it is hoisted by a belt and bucket elevator to a stockpile tram. For the cage, at the other shaft, there is a hoist built by the Lake Shore Engine Works, Marquette, Mich.

At the Fogarty mine the ore is similar to that of the Baltic and is mined by the same method. This property is developed to the fourth level, 365 feet, and also has two shafts, used for hoisting ore and for the handling of men and materials, respectively. It has been in operation since 1901.

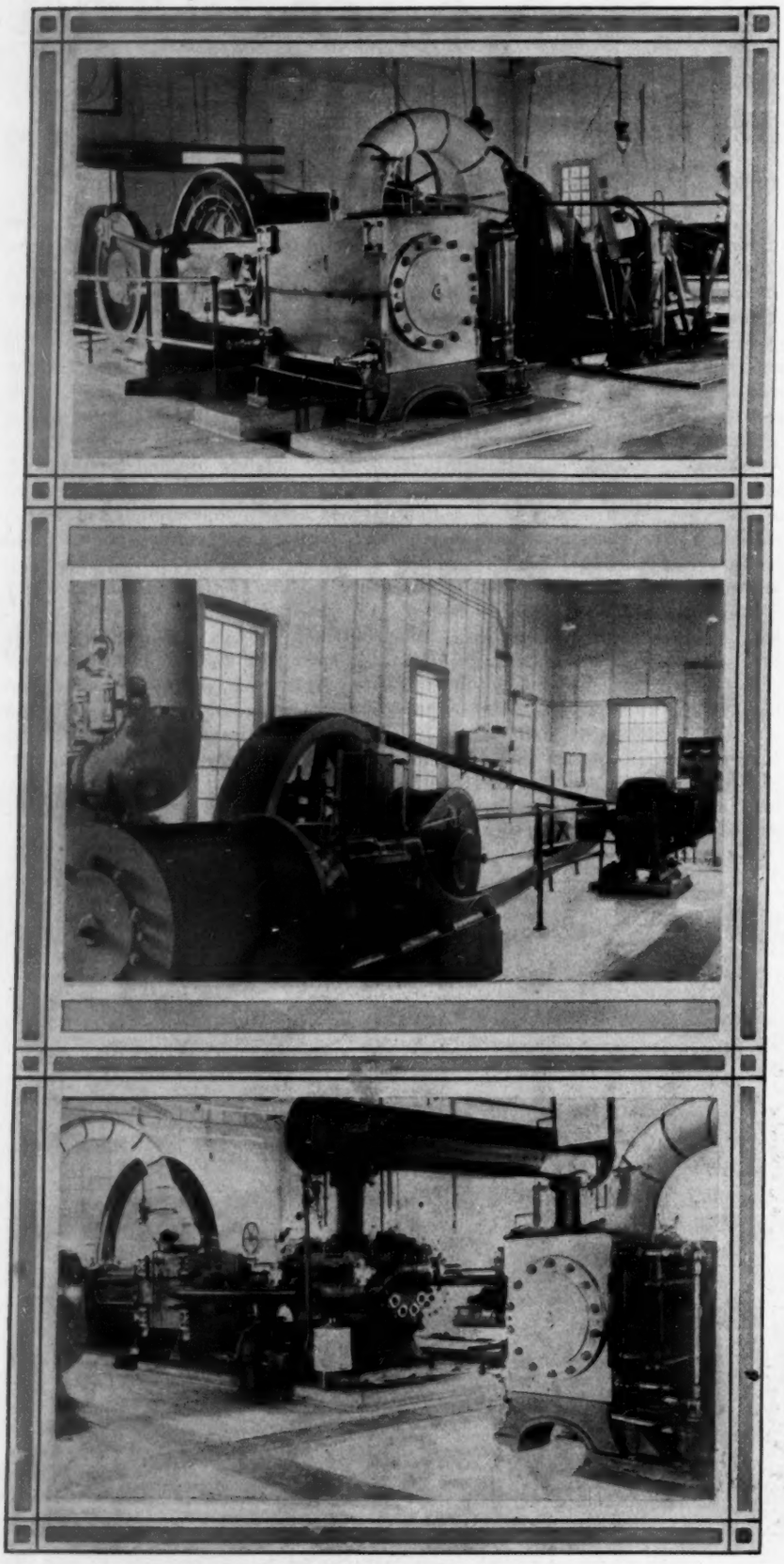
Steam for the surface plant is furnished by three 150-horsepower Erie City boilers, with feed water heater, Prescott pumps, etc. The hoist is a Sullivan, 18 x 40-inch machine, equipped with three 6 x 6-foot drums, only two of which, however, are used at present. An Ingersoll-Rand compressor furnishes air. Electricity for lighting, signaling and other purposes is supplied by a Westinghouse 150-kilowatt, 250-volt generator, at 210 revolutions per minute, belted to a Ball engine, with Westinghouse 3-panel switchboard. In the crusher house is a Gates breaker. The Caspain mine, producing a hard brown hematite which requires reduction in a crusher of the type previously mentioned, also is operated through separate skip and cage shafts. The main surface equip-



ENGINE HOUSE OF BENGAL MINE, SHOWING ELECTRIC COMPRESSOR

ELECTRIC HOIST IN BENGAL ENGINE HOUSE

HOIST AT THE CASPIAN MINE



HOIST AT THE BALTIC MINE
WESTINGHOUSE GENERATOR BELTED TO ENGINE AT BALTIC MINE
INGERSOLL-RAND COMPRESSOR, BALTIC MINE

ment includes a Wellman-Seaver-Morgan hoist, two Ingersoll-Rand compressors and a Fairbanks-Morse high-pressure pump for fire protection. The feature of the boiler-house is a new concrete stack. The mine is provided with four 125 and one 150-horsepower Erie City boilers, with heater, Prescott boiler feed pumps and other auxiliaries.

The Caspian ore body was found in 1900 by churn and diamond drilling. The surface averaged 130 feet and many of the holes were only chopped into the ledge to determine the best location for a shaft. In January, 1902, No. 1 shaft was started. This was a drop shaft and was landed in April, 1902, with difficulty, on account of sand and water. The shaft was continued to 380 feet. From the shaft, cross cuts were started on the second and third levels, and continued across the ore body. Drifts east and west and then cross cuts, 50 feet apart, parallel to the main cross cut, were continued to the rock. No. 2 also was a drop shaft and was sunk to the third level.

Between the second and third levels nine stopes were opened. These were started directly over and about 10 feet above the back of the cross cut. The method used was back stoping; drilling holes into the back and blasting, then standing on the broken ore and drilling another round of holes. The average size of the stopes was 100 feet long, 25 feet wide and 50 feet high, leaving a pillar of 25 feet between the stopes.

The ore near the ledge could not be mined until the water was drained from the sand. Very little work was done on the first level, now called "C" sub-level, until 1908. This level was then extended and cross cuts started directly over the cross cuts on the second level. Small raises were put up from this level in various parts of the mine. A 12-foot test hole was drilled ahead of each cut to ascertain the height of the sand, then 6-foot holes were drilled and blasted. When the test hole reached the sand, 6-foot holes were again drilled and blasted, leaving 5 to 6 feet of ore to hold up the sand. Three more holes were drilled to hasten the drainage. Forty-eight raises were put in and some ran with little decrease in water for over a year.

The present method of mining at the Caspian, as described by Wm. A. McEachern, engineer in charge, is known as top-slicing, whereby the ore is taken off at the top of the bed in slices about 10 feet thick, directly under the overburden. A raise, 20 feet high, was first started from No. 5 east cross cut

on the first level. This was a cribbed raise and had two compartments, one for ladders and one for ore. The height was determined by the distance to the ledge. When this raise was completed, other raises were started and cross cuts east and west were started from them and continued to the rock. This was the beginning of the top or "A" sub-level. The cross cuts were timbered, using 8-foot caps and legs and lagging in the back. Connecting the cross cuts on the end completed one slice. Another slice, 8 feet wide, was then started. These were timbered the same as the cross cuts and lagging laid on the floor when the slice was finished. When the fourth slice was finished, the middle legs of the first two sets were drilled and blasted, bringing the overburden to the floor. The mat which prevents the sand from mixing with the ore consists here of 5 feet of ore left behind, and the caps and legs of timber sets and lagging from the back and floor. The slicing of the pillars was continued until only a 10-foot pillar was left at the main drift. This operation was carried on in as many cross cuts as the demand for ore required and pillars were left on each side of the main drift for the transportation of timber to the two succeeding sub-levels.

The back of "B" sub-level was even with the mat and 10 feet below "A" sub-level. On "B" sub-level there were three points where the operation differed from "A" sub-level:

1.—No back holes were drilled as the ore stripped off the mat.
2.—The timber was kept close to the breast to hold up the mat.
3.—Boards were used on the floor instead of lagging.

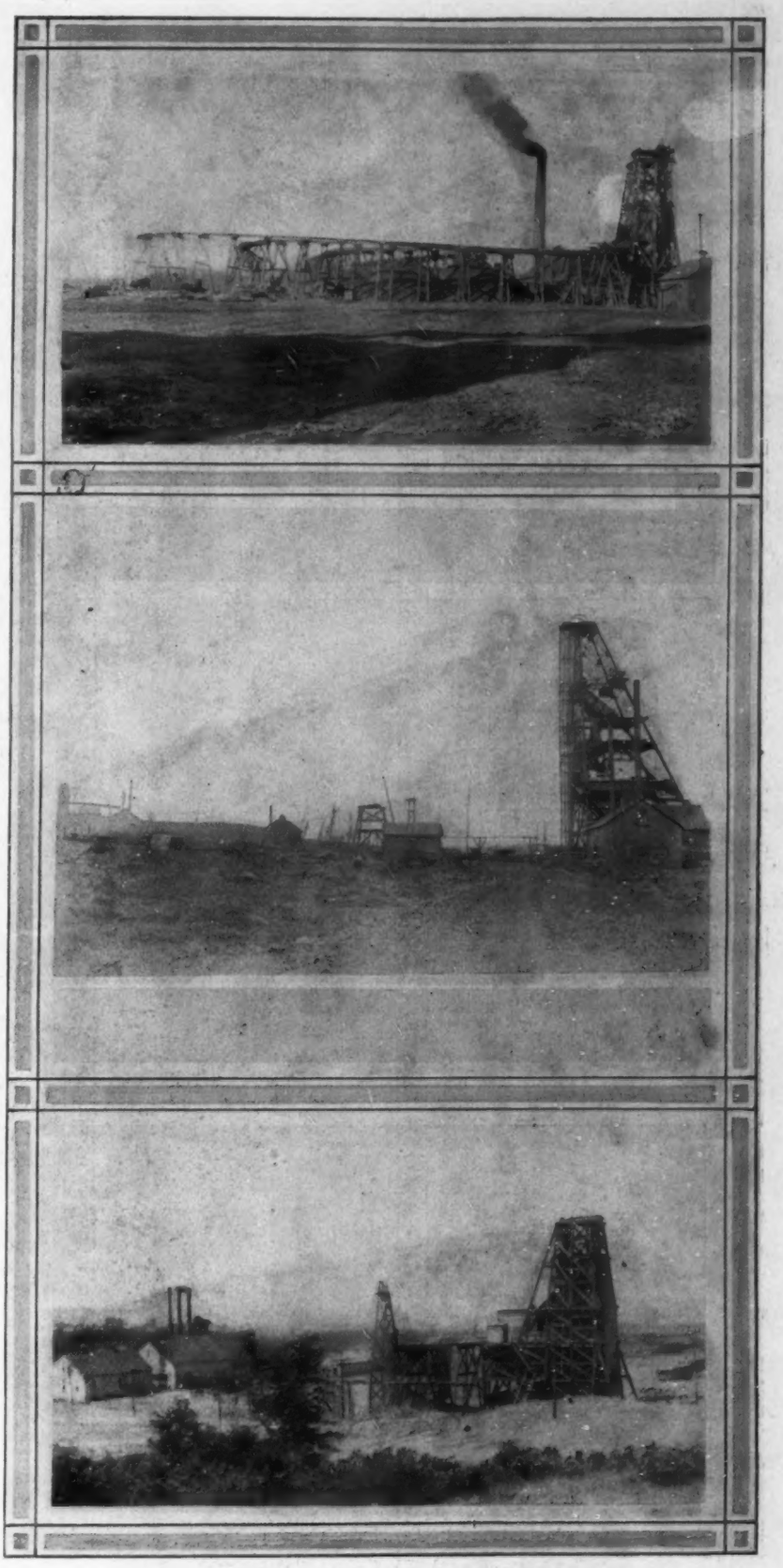
"C" and subsequent sub-levels will likewise show individual treatment, according to the conditions encountered.

Within the next ten years, if one sub-level a year is finished, the sub-levels will be down to the stopes. The stopes must be filled with ore and trimmed and then cross cuts run between the stopes to the rock. The pillars will be sliced the same as before.

When the overburden is let down, part rests on the floor of the pillar and part on the filling in the stope. It will be necessary to carefully watch the chutes to the stope, as lowering the filling might ruin the mat and allow sand to mix with the ore.

The Verona Mining Co. also owns the Bengal, which has not been fully developed, and other properties still in the class of explorations.

The Bengal mine is shipping a



CASPIAN MINE, SHOWING SHAFT HOUSE
SHAFT HOUSES, BENGAL MINE
SHAFT HOUSE, FOGARTY MINE

CASPIAN MINERS' HOMES
A WELL-KEPT MINERS' YARD AT BALTIC MINE
MINERS' RESIDENCE AT BALTIC MINE, RENT $6 PER MONTH

CASPIAN MINERS' HOMES IN FOREGROUND AND RESIDENCES OF HIGHER-SALARIED EMPLOYES IN BACKGROUND
ANOTHER WELL-KEPT YARD AT BALTIC MINE
RESIDENCE STREET, BALTIC MINE

brown hematite ore. This property will be worked on the sub-slicing system similar to that now used at the Caspian.

The pump station is located directly east, about 50 feet from the shaft. It is a solid concrete vault with arched roof, is well-lighted and contains two electrically-driven pumps; one a Buffalo turbine pump with a capacity of 700 gallons for a lift of 400 feet, and the other a Prescott plunger type pump of the same capacity. On the surface is a steel headframe 106 feet high, which contains a No. 7½ Gates gyratory crusher, electrically-driven. The day or change house is a brick structure built to accommodate about 275 men. It contains steel lockers, showers, toilets, etc., and is supplied with hot and cold water, electric lights and steam heat. It contains also an emergency hospital or first aid room. The engine house is a brick structure with steel roof trusses, and contains an Ingersoll-Rand two-stage air compressor, driven by a 400-horsepower Westinghouse synchronous motor, and a geared hoist, built by the Imperial Iron Works, driven by a 225-horsepower General Electric induction motor. The main switchboard, consisting of six panels and a starting and controlling switch for the hoist motor, is contained in this building, also a Westinghouse motor generator set, used to supply current for the underground motors. A small brick transformer house, also with steel roof trusses, is located nearby. The power is supplied to the mine by the Peninsular Power Co., of Iron Mountain, at 6,600 volts, from its sub-station in Iron River, Mich., and is stepped-down to the various working voltages in a transformer house.

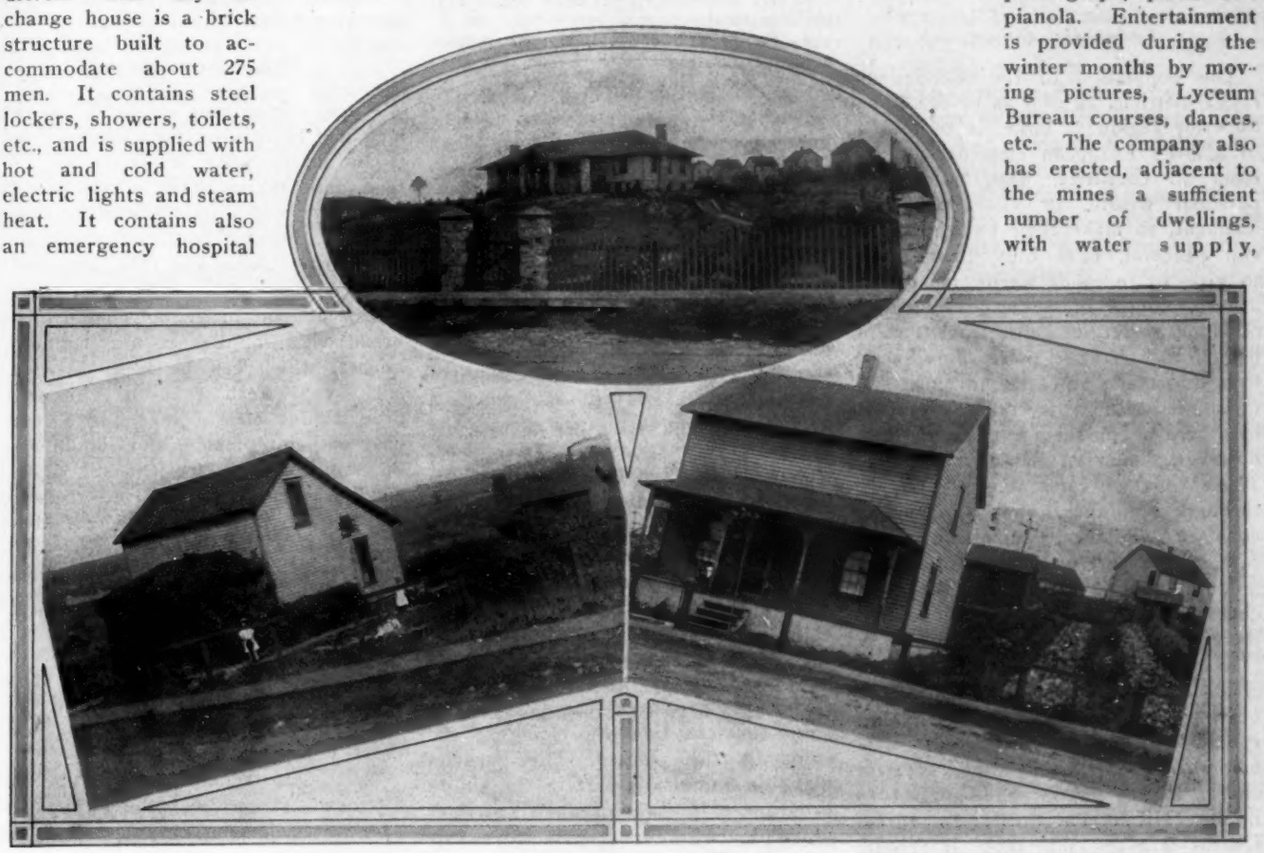
The bell signal system is operated on a 110-volt alternating current circuit, and is so arranged that an incandescent lamp lights in front of the hoist operator simultaneously with each stroke of the bell.

In the near future, another shaft will be sunk, north of the present hoisting shaft, to be used as manway and timber shaft, as at present a cage is operated in balance with the skip in the hoisting shaft, to accommodate the men.

With this shaft, a combined brick engine house, machine shop, blacksmith shop, etc., are contemplated, which also will be electrically-equipped throughout. At all of the company's mines electric haulage systems have been installed underground.

A visitor to the mines mentioned is impressed at once by the well-equipped shops, store-rooms, etc., and above all, by the dry houses, which are among the best on the range. These have individual steel lockers, shower baths, water-closets, etc., and emergency hospital outfits. All buildings are as nearly fireproof as they can be made, with extinguisher equipment, etc.

Two club houses are maintained for the benefit of the company's employes, one being at the Baltic-Fogarty and the other at the Caspian location. The second was completed in 1913. Each has bowling alleys, baths, pool and billiard room and a barber shop, beside a spacious, well-lighted reading room, stocked with papers and magazines. Music is furnished by a phonograph, piano and pianola. Entertainment is provided during the winter months by moving pictures, Lyceum Bureau courses, dances, etc. The company also has erected, adjacent to the mines a sufficient number of dwellings, with water supply, electric lights and other improvements, to house its employes of the various grades. The houses are without the repulsive aspect of the ordinary miners' dwellings. Each house, which is a relatively large structure for its kind, stands in a good-sized yard, and the passer-by is immediately struck by the neat looking gardens which fill most of the space. Later he learns that the company offers substantial money prizes for the best appearing yards, including flower and vegetable gardens, and also separate prizes for the latter. He also observes, with pleasure, that instead of houses painted a uniform red or



CLUB HOUSE AT THE CASPIAN MINE

BALTIC MINE HOUSE; RENT $4, WATER $1 AND ELECTRIC LIGHTS, $1.50

CASPIAN MINE HOUSE; RENT $4, WATER $1 AND ELECTRIC LIGHTS $1.50

green or yellow, such as one instinctively associates with *company* dwellings, the colors are as varied as in any ordinary town; and in other ways, by arrangement, architecture, etc., the dead level of monotony has been avoided. On the locations there are also a number of the best classes of residences for the officials and other high-salaried employes.

Labor conditions, in the judgment of observers, are passing through an experimental stage, and only constant study, coupled with experience, will determine precisely the best methods to be followed in the treatment of employes.

Embryonic Citizens

The population of the Menominee range districts, as well as of the Lake Superior region at large, is composed of a large European element, coming from all countries, who, lacking in personal wealth, or educational refinement, to make their lives pleasant and peaceful, have only their labor to give, or in other words, must lead a hard, pioneer life. The present laws of labor, society and government soon begin to change these foreigners' lives and make potential citizens. The laws of personal freedom, exercised here under pioneer conditions, are, however, misused and misjudged. These make for abuses, largely through ignorance, and it demands constant vigilance, supervision and care on the part of mine managers to guide these newcomers into the right channels of thought and action toward their employers and each other.

In the proper view of this broad civic duty, and its many relations, the bearing which it has upon mining should be closely considered. The labor cost is usually the greatest charge in production; and, applied to mining, from two-thirds to three-fourths is a probable rate. It should, therefore, be given the greatest measure of attention. There are employed in the operation of mining: (1) Experts in securing or winning the mineral in the ground, represented by the mining captains; (2) engineers and experts of machinery; (3) experts in geology; and (4) expert secretaries and auditors. But can it be truly said that there are experts for the handling, care, and study of labor? Most readers of this journal will undoubtedly agree that it is the one matter which until recently has been seriously neglected.

"Am I my brother's keeper?"

"Yes," replies the experienced mine official, "when it is a serious financial question of two-thirds of the cost of mining ore in the district. Yes! When you consider it financially, morally or from a broad civic view, as this is the object of government." It, therefore, behooves mine managers to take the proper measures for giving these considerations practical effect.

"How shall we begin?"

1.—By having every kind of safety device, as applied to mining and machinery, with a competent surgeon and a trained corps of employes to give first aid to the injured.

2.—By not allowing men to work two or three shifts continuously and without rest, which over-taxes their physical strength; also to see that they have a true knowledge of mine conditions.

3.—By compulsory accident funds and pension systems.

4.—By providing good, sanitary houses and surroundings, with a social center typified by a club house.

During the past few years a large number of valuable ideas have been put in vogue as regards safeguarding machinery. In mining it is not so easy. A safety committee, composed of from three to five employes of average intelligence, at each mine, can easily criticize all dangerous places, and have them properly attended to, to save injury. Their report of criticism can be gone over by a meeting of bosses and employes, say once a month, and in this way, spread the general information of safety first, which makes a vital subject in which each and all are interested. This spirit prevailing through the whole force of employes will save many injuries ordinarily due to general neglect or oversight, and will help to bring about amicable relations between nationalities where friction exists. Safety signs can be displayed to direct attention to hazards and these can be renewed from time to time by changing the color of the placard. The surgeon plays an important part in the safety program. He can organize a class of employes to render first aid to the injured. The money so spent is returned in many ways.

High Fatality Record

Next to railroading, statistics classify mining as producing the greatest number of fatal accidents. As one stops and ponders why, it must be concluded that the following elements enter into the subject: (1) That a large number of men go down in the dark drifts and stopes who are young, without judgment and knowledge, lacking a proper understanding of the English language; (2) careless fellow workers; (3) lack of sufficient light to see how to perform the necessary work; (4) poor tools or dangerous conditions in working places, left so by the employes on the previous shift; (5) lack of knowledge of explosives; (6) long hours in bad air, and numerous other causes, all of which are apt to end fatally. Also the lack of judgment of green and ignorant employes, who take the risks in order to secure the higher wages for duties which they are not fitted to perform should be considered.

To avoid all this the mining captain should have, as he does with the Verona Mining Co., a man constantly to study the employes in their different nationalities, to cope with the personal problems always arising and to build up an organization to overcome the dangers inherent in the changing conditions on each level.

Social Surroundings

Wages being approximately equal, men will leave a property where there is an old or poor dry-house and go to a mine where there is one that is up-to-date and supplied with washing facilities, such as cold and warm water, shower baths and tubs, individual lockers, etc.

This humane phase, considered in its broad view, applies to the company houses, which can be kept clean inside by a fresh coat of whitewash or calcimine once a year, and a fresh coat of paint outside, and should also be supplied with fresh water and a small garden, with growing trees to make it look like a home. To encourage this latter idea and to start it for a few years, prizes can be given, as mentioned in the foregoing, for the best vegetables or flower gardens, also a small expenditure may be made in free seeds to get the movement properly started. It has been found that the women and children are the ones most important to interest.

Up-to-date schools, a church and a social center at which to congregate, such as a club house, round out a complete whole in the lives of the employes of a mine. This latter may seem a luxury, but club houses, such as those at the Baltic and Caspian locations previously described, change the course of the men's thoughts and form a pleasant contrast to the daily labor done under dark and dirty conditions. This club house, always kept clean and cheerful, and used by wives one day of the week, with permission to boys and girls for special facilities at other times, has proved of great value in the case of the Verona Mining Co.'s properties.

The officer of the company whose duty it is to look after the men can readily arrange with entertainment companies for minstrels, popular lecturers and singers, combined with

(*Continued on page* 792c.)

Electric Smelting of Ferro-Alloys

Second of Four Articles—Details Covering Production of Ferro-Manganese, Ferro-Nickel, Ferro-Tungsten and Other Alloys

BY ROBERT M. KEENEY

IN STEEL manufacture more ferro-manganese than any other ferro-alloy is used. The industrial importance of ferro-manganese began in 1866 with the introduction of the bessemer process, which required a strong deoxidizing agent to produce a sound steel. In 1866, Prieger of Bonn, Germany, made in the crucible some ferro-manganese containing 70 to 80 per cent manganese. At Terre-Noire, France, a little later it was made in the open-hearth furnace and crucible in a combination process. The first ferro-manganese to be made in the blast furnace was produced in Sweden in 1873, and contained 33 per cent manganese. In 1875, at Terre-Noire, Pourcel made in the blast furnace some ferro-manganese that contained 75 to 80 per cent manganese. Since that time up to a few years ago all ferro-manganese was made in the blast furnace. At present a comparatively small quantity is made in the electric furnace, the greater part of that so made being used for the production of ferro-manganese-silicon or silico-manganese. When the iron-manganese alloy contains less than 25 per cent manganese it is called spiegeleisen; when it contains more than 25 per cent it is called ferro-manganese.

Early Experiments.

Stassano in 1908 made some experiments in the production of ferro-manganese in a 75-kilowatt electric furnace of the type of the Stassano steel furnace. The charge consisted of 1,000 parts of manganese ore, 300 parts of charcoal, 60 parts of lime, and 80 parts of 25 per cent sodium silicate used as a binder for briquettes of the above composition, the form in which the charge was smelted. The ore used contained 45.65 per cent Mn_3O_4, 16.1 per cent Fe_2O_3, 3.05 per cent Al_2O_3, 30.16 per cent SiO_2, 0.15 per cent BaO, 1.2 per cent CaO, 0.43 per cent MgO, 0.817 per cent S, and 0.34 per cent P. The desired product was to be silico-manganese containing about 60 per cent manganese and 20 per cent silicon. The charge was submitted to the heat radiated from the arc as in all Stassano furnaces.

The product contained 17.76 per cent iron, 17.6 per cent silicon, 62 per cent manganese, 1.8 per cent carbon, 0.028 per cent phosphorus, and a trace of sulphur. No data showing the losses of manganese were given. The energy consumption was 3.86 kilowatt-hours per pound, or 7,560 kilowatt-hours, 0.86 kilowatt-year, per long ton.

Ferro-manganese is still manufactured almost entirely in the blast furnace. When the manufacture of ferro-alloys in the electric furnace began, attempts were made to make ferro-manganese. These failed, chiefly because of operation of the electric furnace at so high a temperature as to produce great volatilization of the manganese. As the electric furnace became better understood, heating by resistance only was found possible, thus insuring a low enough temperature.

Sources of Ferro-Manganese

Most of the blast-furnace ferro-manganese used in this country, with the exception of that made by one large corporation, is made in England. Recently some German ferro-manganese has been put on the market. Russian or Turkish manganese oxide ore is used. Ores high in silicon cannot be used because of the high loss of manganese as silicate in the slag. The loss of manganese by volatilization, or as dust, varies between 15 and 30 per cent of the total quantity of manganese charged. The average total loss is about 30 per cent, of which 10 per cent goes to the slag and 20 per cent is volatilized or lost as dust. Any phosphorus in the ore goes to the metal, but there is no difficulty in slagging the sulphur. No more than 0.02 per cent of phosphorus should be present for each 10 per cent of manganese in the ore. The manganese as a rule is unevenly distributed through the alloy. Usually some limestone is necessary in the charge. The alloy produced in the run discussed above is high in phosphorus. An average English ferro-manganese contains 83.4 per cent manganese, 9.04 per cent iron, 6.5 per cent carbon, 0.8 per cent silicon, 0.25 per cent phosphorus, and 0.01 per cent sulphur.

When ferro-manganese is being made in the electric furnace, the electrodes and voltage are regulated so as to prevent arcing. With a mixture of 813 parts of ore containing 30 per cent manganese, 178 parts of anthracite coal (4 to 5 per cent ash), and 90 parts of fluorspar, about 450 pounds of product was obtained per ton of mixture treated. The product contained 85 per cent ferro-manganese. Of the total manganese charged 26.8 per cent was lost by volatilization, as dust, and in the slag. Ferro-manganese made in the electric furnace has considerably lower carbon content than the blast-furnace ferro-manganese, and is used in the molten state by the ferro-alloy manufacturer for making silico-manganese.

Ferro-manganese-silicon or silico-manganese is an alloy developed since use has been made of the electric furnace for ferro-alloy manufacture. Ferro-manganese is made from manganese ore in an electric furnace operated as a resistance furnace, and ferro-silicon is made in a separate arc furnace. The two products are mixed while hot in a ladle, to form the alloy of the desired percentage of manganese and silicon. Ferro-manganese containing about 85 per cent of manganese is made. The percentage of ferro-silicon depends on the amount of iron desired in the finished silico-manganese.

Making Silico-Manganese

The other method of manufacture is to mix coal, quartz, manganese, oxide ore, and iron turnings in the proper proportion to form the desired silico-manganese and smelt it all in one furnace which must be kept at a high temperature because of the high reduction point of silica. The great disadvantage of this method is the high loss of manganese by volatilization. This method, however, seems to be the favorite one, as it is quicker, only one furnace is involved in the process, and less labor is necessary. It should be noted that the price of silico-manganese does not increase with the manganese content but with an increase in the percentage of silicon. This is because much more energy is necessary for reduction of silica than of manganese oxide. A third method of manufacture is to reduce rhodonite ($MnSiO_3$) with carbon in the electric furnace. In this method coal or coke is mixed with rhodonite containing 38 per cent manganese, in the proportion of 600 parts of ore to 100 parts of coke. The electrode consumption is very high, being about 200 pounds per ton of product, and the power consumption is 5,400 kilowatt-hours or 0.62 kilowatt-year per ton. Keller adds ferro-silicon to a fused mixture of ferro-silicon, quartz, carbon

We are indebted to the Bureau of Mines, Department of the Interior, for the use of this material.

and manganese ore, claiming that the reduction temperature remains low and prevents volatilization of manganese.

Three grades of ferro-manganese-silicon are made as follows: 50 to 55 per cent manganese, 23 to 28 per cent silicon; 68 to 75 per cent manganese, 20 to 25 per cent silicon; 50 to 55 per cent manganese, 30 to 35 per cent silicon. The carbon content in these alloys is low, owing to the action of silicon in breaking up the combined carbon in the ferro-manganese, causing the carbon to separate as graphite, which rises to the surface of the bath. With less than 16 to 18 per cent silicon in the alloy, carbon remains in the combined state; with more than that percentage, any carbon present is in the form of graphite. Analyses of typical silico-manganese are given below:

Constituent.	Per cent		
	1	2	3
Silicon	24.1	24.6	24.1
Manganese	74.2	70.3	55.0
Iron	.77	3.8	19.0
Aluminum	.....	.4	.4
Calcium	.....	.3	.3
Magnesium	.....	.2	.2
Carbon	.30	.35	.35
Sulphur	.01	.02	.02
Phosphorus	.02	.04	.04

Alloys similar to those represented in analyses one and two above are used for incorporating manganese and silicon in steel. The alloy is also used for deoxidizing, when a composition similar to that given in analysis three is generally employed. The product has the advantage over ferro-manganese of being low in carbon, yet possessing as strong a deoxidizing power. Its use is especially advantageous in making high-grade manganese-silicon steel. Silico-manganese is usually added to the furnace just before the furnace is tapped, or in the casting ladle during tapping.

Electric Smelting of Ferro-Molybdenum

Ferro-molybdenum is generally manufactured in the electric furnace from the raw sulphide ore of molybdenum, molybdenite. It is also made by the reduction of the roasted sulphide with carbon in a crucible or an electric furnace. The alloy is not widely used because of its high cost, which is caused by the irregularity of the ore supply. With a better and steadier source of ore, ferro-molybdenum would probably be used in place of ferro-tungsten. Ferro-molybdenum was made from roasted ore in the crucible before the introduction of the electric furnace, but has been produced commercially directly from the sulphide only since 1900, following the use of the electric furnace.

Ferro-molybdenum is manufactured commercially in an electric furnace of the electrode type operated as a resistance furnace, or in a crucible furnace of the resistance type. Comparatively little ferro-molybdenum is made because of difficulty in getting ores, as satisfactory methods of concentrating molybdenite ores have not as yet been fully developed. There are deposits of molybdenite in the United States in Maine, Oregon, Colorado, Nevada and Washington. There are also deposits in Canada, Germany, Japan, Mexico, New South Wales, New Zealand, Norway, Peru and Queensland. Queensland and New South Wales are the largest producers. Buyers require an ore or a concentrate containing 90 to 95 per cent molybdenite, for which the price is about $450 per short ton. In commercial manufacture, raw or roasted molybdenite, iron turnings, lime and coke or coal are mixed to give a ferro-molybdenum of the desired proportions, and the mixture is treated in the electric furnace. The furnaces are operated intermittently; that is, one charge is completely discharged before another is added. Analyses of typical electric-furnace ferro-molybdenum are given in the table following. Ferro-molybdenum is first made as a high-carbon alloy containing 3 to 4 per cent carbon. This is then decarburized with a lime slag or a slag of lime and iron oxide. If the latter is used, the percentage of iron in the alloy is increased. The material analyses as follows:

	Per cent			
Molybdenum	85.8	75.0	85.2	50.311
Iron	10.963	18.5	14.047	48.92
Carbon	3.07	4.0	.45	.35
Silicon	.11	.2	.252	.30
Aluminum	.....	.1	.....	.....
Calcium	.....	.15	.....	.....
Manganese	.....	.15	.....	.....
Sulphur	.05	.03	.031	.030
Phosphorus	.007	.03	.02	.20

Ferro-molybdenum in definite proportions is added to steel in the open-hearth, crucible or in the electric furnace. It gives the steel properties similar to those of tungsten steel, but only one-third to one-quarter as much is necessary. Molybdenum is added to steel that is to be used for such forgings as crank and propeller shafts, for gun barrels, wire, boiler plates, armor-piercing shells, motor-car steel, magnet steel, and high-speed steel.

Ferro-Nickel

Nickel is usually incorporated in steel by the addition of metallic nickel rather than of ferro-nickel. Most of the ferro-nickel now used occasionally is made in a crucible furnace, fired by coal or gas, rather than in the electric furnace, as it is made by simply melting iron and nickel in the proper proportions. The metallic nickel used contains 99 per cent nickel. Ferro-nickel as supplied contains 25 per cent, 35 per cent, 50 per cent, 75 per cent and 85 per cent nickel. The impurities in these alloys consist of 0.5 to 1 per cent carbon, 0.2 to 0.3 per cent silicon, 0.01 to 0.02 per cent sulphur, and 0.2 to 0.3 per cent phosphorus. It is claimed that these alloys give a more homogeneous mixture of nickel in the steel than is obtained by the use of the ordinary nickel metal. The alloy is malleable, homogeneous and can be readily rolled, drawn or worked. The ferro-nickel containing 25 per cent nickel is practically non-magnetic.

In 1907, during the course of the experiments on the production of pig iron in the electric furnace at Sault Ste. Marie, several runs were made on the reduction of roasted pyrrhotite with charcoal.

The furnace was later used in the production of ferro-nickel. The results of the work done later is given in a report by the metallurgist of the company that purchased the furnace. The ore and raw materials were of about the composition given for those substances in the table above. Four hundred pounds of briquetted roasted ore, 140 to 150 pounds of limestone, and 120 pounds of charcoal were the proportions used. During four months of operation, 154 short tons of ferro-nickel of approximately the composition given was produced, with a power consumption of 0.34 kilowatt-year per ton. The electrode consumption was 40 pounds of amorphous carbon per ton of ferro-nickel. To produce a product containing 4 per cent nickel, 2.75 per cent silicon, 0.8 per cent copper, 0.01 per cent sulphur, and 0.03 per cent phosphorus, on the average 2 tons of roasted pyrrhotite (2 per cent sulphur), 1,500 pounds of limestone, and 1,200 pounds of charcoal were used.

Other Alloys of Iron and Silicon

For the use of foundries several alloys have been manufactured, such as ferro-silico-manganese-aluminum, ferro-silico-aluminum, and silico-calcium-aluminum. These alloys are intended for use as rapid deoxidizing and refining agents, and form easily fusible silicate slags of the other elements which rise to the surface of the bath, as they are of low specific gravity. These alloys are too expensive for use in the large-scale production of ordinary steel.

Ferro-silico-manganese-aluminum is made in two grades, one containing 18 to 20 per cent silicon, 18 to 22 per cent manganese, and 9 to 12 per cent aluminum; and the other containing 9 to 11 per cent silicon, 9 to 11 per cent manganese, and 4.5 to 6 per cent aluminum, the rest in both grades being iron and carbon. The alloy is made by melting ferro-silicon-manganese and aluminum together. It is added in the

ladle or molds, or in the furnace itself. It is used largely for cast steel, when the steel is cast directly into molds.

Another similar alloy is ferro-silico-aluminum, containing about 45 per cent silicon and 12 to 15 per cent aluminum, the rest being iron and carbon. It is made by alloying ferro-silicon and aluminum in the electric furnace. This alloy is intended for deoxidizing purposes. It is added in the electric steel furnace just after removal of the oxidizing slag. The alloy is in powder form and is also used in the tapping ladle for removing oxides. Sometimes it is added to the ingot molds. The electric furnace is the only furnace to which it is added for the manufacture of steel, because in the open hearth or converter there is great loss of the alloy. Ferro-silico-aluminum has not the reducing power of aluminum, but it is sufficient for the removal of most oxides.

Ferro-silico-calcium-aluminum is an electric-furnace product containing 50 to 55 per cent silicon, 18 to 22 per cent calcium, 12 to 15 per cent iron, 4 to 5 per cent aluminum, 1 to 1.25 per cent carbon, 0.35 per cent magnesium, 0.22 per cent manganese, 0.075 per cent sulphur and 0.03 per cent phosphorus. It is a strong deoxidizer and desulphurizer, and gives highly fluid slags. It is added in the electric furnace after the removal of the oxidizing slag. It can be added in the casting ladles, crucibles, or molds. Because of its high cost, its use is restricted to the manufacture of high-class steels.

Ferro-titanium has been developed for use in steel manufacture since the introduction of the electric furnace for ferro-alloy production in 1900. In 1892 Rossi obtained a patent on the reduction of titaniferous ores in the blast furnace. Later he attempted to make a ferro-titanium in the blast furnace and crucible but could not obtain a product with a high percentage of titanium. Subsequently experimental work in the electric furnace resulted in the commercial establishment of the manufacture of ferro-titanium for steel making. Foreign manufacturers of ferro-alloys produced ferro-titanium on a small scale in the electric furnace. A considerable amount is made by the Goldschmidt thermit process. This grade is carbon free but contains as high as 5 per cent of aluminum, and is said to be more expensive than the electric-furnace product.

All ferro-titanium now produced is manufactured either by reduction of ores with carbon in the electric furnace or by the Goldschmidt thermit process, most of it being made in the electric furnace. No other process gives a high enough temperature, 2,000 degrees Cent., or over, for reduction of titanium from the oxide. In Rossi's first patent on ferro-titanium, he specifies the reduction of titaniferous ores and rutile with carbon in an electric-resistance furnace to produce an alloy containing more than 5 per cent titanium and some carbon. The reduction is performed over a bath of molten iron. Another patent, granted the same date, covers the use of titaniferous slag in the same manner. In 1900 he procured a patent on the reduction of titanium ores by the addition of ores to a bath of molten reducing metal, such as aluminum, in the electric furnace. In 1901 Rossi was granted a patent on a process for the concentration of titanium in slag by reducing the iron and silicon of a titaniferous ore with carbon at a temperature lower than the reducing point of titanium oxide.

Ferro-titanium is manufactured commercially at one plant in a Siemens type of electric furnace of about 500 kilowatts capacity. A molten bath of iron from scrap iron or steel is first formed in the bottom of the furnace. Titaniferous ore, titaniferous slag, or rutile, is then mixed with carbon in the proper proportion, charged on the molten bath, and reduced in the arc. The product is tapped off and broken up for packing. If the slag is high in titanium it is run back through the furnace. The titaniferous ore contains 34.36 per cent TiO_2, 50.53 per cent FEO, 4.14 per cent SiO_2, and 2.20 per cent Al_2O_3. The product obtained from this reduction without any refining contains 10 to 15 per cent titanium, 5 to 8 per cent carbon, and 0.35 to 1 per cent silicon. By refining this alloy, with rutile as a decarburizer, an alloy is made that has 10 to 15 per cent titanium, less than 1.0 per cent carbon, and 0.35 to 1 per cent silicon.

Ferro-Tungsten

Ferro-tungsten with a low percentage of tungsten was made by Berthier in 1834. Caron studied iron tungsten alloys in 1868 and determined that the hardness increased the percentage of tungsten. In 1866 Biermann made some ferro-tungsten from tungsten dioxide and iron in the crucible. This method was used up to the introduction of the electric furnace in 1900, since which time most of the ferro-tungsten has been made in the electric furnace, although small quantities, containing less than 60 per cent tungsten, are still manufactured in the crucible. The crucible product is made by the reduction of tungsten trioxide with carbon. In electric-furnace methods raw ores or concentrates are reduced.

Stassano conducted experiments on the manufacture of ferro-tungsten from wolframite concentrates in a 75-kilowatt electric furnace, with charcoal as a reducing agent. The concentrates, charcoal, and lime were crushed and briquetted with a 25 per cent solution of sodium silicate as a binder. Theoretically the ferro-tungsten should have contained 71.5 per cent tungsten, 20.6 per cent iron, 7.1 per cent manganese, and 1 per cent silicon. The results of Stassano's experiments are tabulated below:

Constituent of ore charged:	Per cent.
WO_3	69.8
SiO_2	2.0
FeO	20.5
MnO	7.3
S	.2
P	Trace.
Constituent of charge:	**Parts.**
Wolframite	1,000
Charcoal	190
Lime	40
Mn_2SiO_3	80

The composition of the products of the three experiments was as follows:

	Proportion in experiment No.		
	1	2	3
Constituent.	Per cent.	Per cent.	Per cent.
W	58.00	65.66	69.76
C	2.40	2.062	2.50
Mn	3.192	3.50	3.60
Si	1.244	1.02	1.30
P	Trace	Trace	Trace
S	Trace	Trace	Trace
Kilowatt-hours per pound of product	2.73	2.95	3.90
Kilowatt-years per ton (2,000 lbs.) of product	0.62	0.67	0.78

The average energy consumption was three kilowatt-hours per pound, or 0.68 kilowatt-year per ton. These experiments showed the possibility of reducing wolframite with carbon in the electric furnace, but did not show where the loss in tungsten occurred. It is not apparent whether the low tungsten content was the result of slag losses or the presence in the furnace of some unnoted iron which diluted the alloy.

In 1911 the writer performed some experiments on the reduction of ferberite with carbon to produce ferro tungsten in the electric furnace. The furnace was the one to be described later in this series in the discussion of the production of ferro-chrome. Pure calcium fluoride was used. The iron ore contained 94.9 per cent Fe_2O_3, 4.10 per cent SiO_2, 0.79 per cent CaO, 1.46 per cent Al_2O_3, 0.05 per cent P, and 0.03 per cent S. Ferberite concentrates from Boulder county, Colo., of the following composition were obtained: 58.72 per cent WO_3 (46.6 per cent tungsten), 30.08 per cent FeO (23.4 per cent iron), 2.55 per cent MnO (0.84 per cent manganese), 4.86 per cent SiO_2, 3.46 per cent CaO, 0.34 per cent P, and 0.20 per cent S.

In each experiment a decarburizing slag of iron ore, lime, and fluor spar was added to the furnace when reduc-

(*Continued on page* 792b.)

Research Institute

Mellon Laboratories Are Fully Equipped for Solving Manufacturing Problems

BY C. F. WILLIAMS

THE VALUE of research in metallurgy has long been recognized. Some of the larger manufacturers are conducting research work on an elaborate scale to further perfect their products. The United States Steel Corporation has spent more than $800,000 at its Homestead Steel Works, Munhall, Pa., in investigations on the electro-thermic production of steel alone. However, metallurgical research laboratories are comparatively uncommon, principally because of the expense of equipping them properly.

The Mellon Institute of Industrial Research and Specific Industries of the University of Pittsburgh, recently dedicated, promises to solve the research laboratory problem for such concerns as do not want to enter this field at their own plants. The institute has been established on a permanent basis by Andrew William Mellon and Richard Beatty Mellon, Pittsburgh bankers, who are closely connected with the iron, steel and allied trades. They have given more than $500,000 to the institute, for a building, apparatus, library and a yearly maintenance fund. For this reason the Mellon Institute is in a position to offer research facilities equal to those of most industrial concerns, at a rather low cost.

The purpose of the institute is to take perplexing manufacturing problems and, by applying contemporary science, work out a practical commercial solution. The work is accomplished by the foundation of industrial fellowships, supported and maintained by those seeking research along particular lines. Fellowships are not permitted to be duplicated, except under special conditions.

Robert Kennedy Duncan, the late director of the Mellon Institute, was said to be the first to propose industrial fellowships. He established the first industrial fellowship in January 1907, at the University of Kansas, where he held the chair of industrial chemistry.

To protect the interests of manufacturers supporting fellowships, most of the work undertaken at the institute is of a secret nature, yet the results obtained eventually will be published for the benefit of the whole industrial world. Announcements are not made, however, until after the manufacturers establishing fellowships have had an opportunity to reap some benefits.

The home of the Mellon Institute is a five-story building of modern design. The basement contains the main storeroom; boiler room; electric furnace room; heavy apparatus room, Fig. 3; a room equipped for low-temperature work; machine shop, Fig. 4, and kitchen. Administration offices, library, assembly hall, special apparatus room and dark-room laboratory are on the first floor. The second and third floors each contains 10 large research laboratories and nine small ones, as shown in Figs. 1 and 2. The fourth floor will contain a similar number as soon as the growth of the institution warrants its completion. Twenty-three fellowships are in operation at present and 40 research chemists are engaged in spe-

FIG. 1—INTERIOR VIEW OF ONE OF THE 20 LARGE RESEARCH LABORATORIES

FIG. 2—ONE OF THE 18 SMALL LABORATORIES

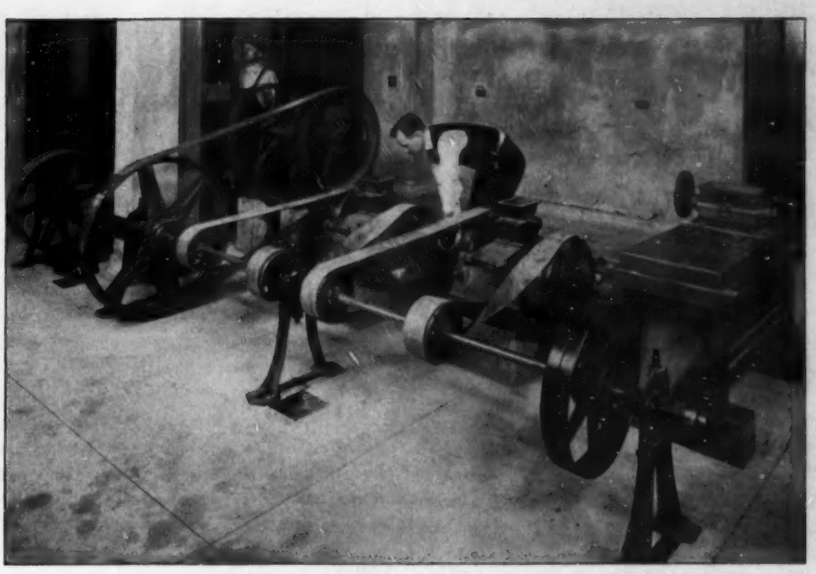


FIG. 3—A VIEW IN THE HEAVY APPARATUS ROOM

cial work at the institute. While no work is being undertaken for iron, steel or allied interests, yet negotiations have been opened by several steel-making concerns and fellowships probably will be established by them at an early date.

It is good practice to change wheels from one machine to another as they wear down, having the speed of the machines varied according to the diameter of the wheel. Some shops provide different size pulleys so that the speed of the machine may be increased to compensate for the wear of the wheels.

Book Review

Preventing Losses in Factory Power Plants, by David Moffat Myers, a volume in the works management library published by the Engineering Magazine Co., and sold by *The Iron Trade Review* for $3, net.

That in excess of one-fourth of the coal handled by the average fireman in a power plant is wasted is the proposition the author asserts. He proceeds to prove its truth and then supplies remedies to prevent this loss. The first nine chapters are addressed particularly to the proprietor or manager and undertake to put the engineering and economic argument in such clear terms that it can be apprehended readily.

The remainder of the work takes up a detailed study of the principal power plant questions for the advantage of the mechanical superintendent and factory engineer. In these two endeavors the volume covers a new field and offers material for power plant engineers which heretofore has not been available.

The author asserts in his preface that were he limited to the publication of only one chapter he would choose the ninth, dealing with the human factor, regarding this as the

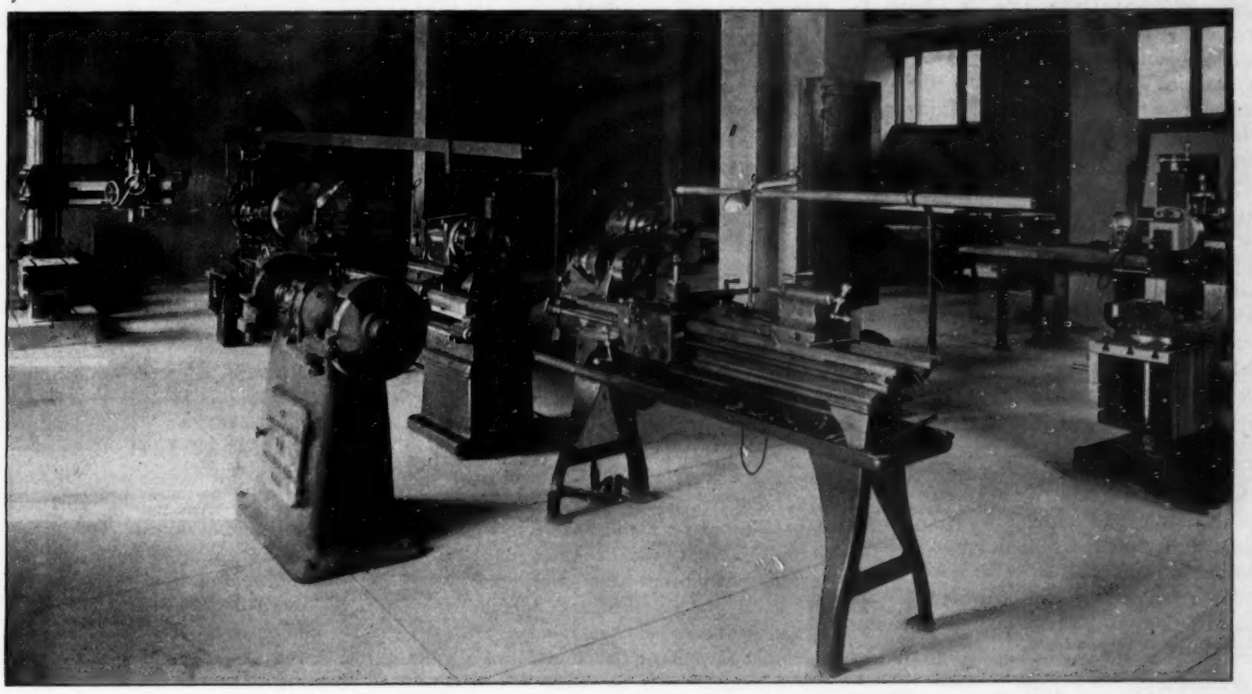


FIG. 4—A CORNER IN THE MACHINE SHOP, SHOWING VARIETY OF EQUIPMENT

keynote of the entire problem of economy in the fireroom. With increasing cost of coal, due to greater expense of producing and marketing, it is becoming more and more of a problem to reduce the quantity burned for a definite output of power and the study of engineers along the line of cutting down preventable wastes is providing a means for large savings in the cost of fuel. To awaken the executive of a company to the possibility of saving in this department has been the first aim of this work. This accomplished, the author proceeds to a discussion of the means to be employed to bring about these economies. The data in the volume are from actual experience in the plants of clients and represent the results of experience in correcting wastes and bringing about more efficient handling of the fuel question. The book is attractively printed.

The Prevention of Infection

BY THOMAS DARLINGTON

IN GENERAL terms, the four chief purposes of first aid are to relieve pain and shock, to control hemorrhage, to close gaping wounds and replace separated tissue or bones, and to prefent infection. In this article only the last of these will be considered.

Infection is caused by certain micro-organisms entering the tissues. These micro-organisms, or bacteria, are of many varieties. We must, as far as possible, prevent their entering a wound by promptly covering the wound with sterile bandages or other dressings, applied with clean hands. If bacteria have already entered the wound, we must remove them or at least lessen their activity. This is done by a thorough cleasing of the injured tissues in air that is free as possible from bacteria, and by applying antiseptic dressings with well washed and disinfected hands and with sterile instruments. Without these precautions, cases of infected wounds are frequent and the damage arising from this source is often irreparable. Life itself is jeopardized by such poisoning. A pin prick has been known to cost a life. Even if an injury does not end fatally, it may cost the insurance carrier, under the workmen's compensation law of the state of New York, for example, as much at $3,500, and the injured person may never again be able to work.

The amount of trouble caused by such infections depends upon the kind and virulence of the germs, and also upon the track which the bacteria take—whether they follow the lymph canals, or follow the fascia to the spaces between the muscles, or follow up the sheath of the tendons.

An observer at a public hearing of the New York state workmen's compensation commission, noting the victims of accidents as they appear there, would be impressed with the large number of deformities of fingers and hands due to infection of wounds. Case after case has come before the commission, where such poisoning has resulted in necrosis of bone and made necessary its removal; or tendons have been divested of their sheaths and become fastened to the tissues and will no longer function; or the muscle itself has been destroyed by an abscess; or nerves have been ruined, causing paralysis; or joints have become ankylosed and will not bend. As a result, the fingers and hands become deformed, twisted and useless. Thousands of dollars of compensation have been lost, and many a good workman has been incapacitated for life—and all needlessly.

Of 15,000 cases in which awards were made by the New York state workmen's compensation commission during 1914, 2,100 cases were examined by the medical department. Of these, a little over 17 per cent or one in every six, were due to septic infection. Had it not been for such infection, the large majority of these cases would have recovered within the period prescribed in the law as the test for non-compensable minor accidents, to the manifest advantage of all concerned.

Forty years ago is was taught that such infection was inevitable, and that pus in a wound was part of a normal process. At that time Sir Joseph Lister had just commenced to teach antiseptic surgery, but his precepts were not then generally accepted. How wonderfully in the last generation have his claims been substantiated and corroborated! Now we know that with proper first aid and care, such infection is unnecessary.

The records of the Carnegie Steel Co., the Youngstown Sheet & Tube Co., the Cambria Steel Co., and others, prove this. Where formerly in the American iron and steel industry about half of the wounds were infected, now little more than one per thousand cases of injury become infected. This shows what can be done in lessening such infection, in preventing loss of time, in saving payment of compensation, and above all in preventing the horrible deformities which mean so much in the life of the victims of accident.

From a recent issue of the Bulletin of the American Iron and Steel Institute, New York. The author, Thomas Darlington, is secretary of the welfare committee of the institute.

Automatic Ventilator

Recently the subject of exhaust ventilation has been given considerable study and among the various concerns that have been prominent in developing devices for eliminating vitiated air from industrial buildings is the Pullman Automatic Ventilator Mfg. Co., York, Pa. This concern has brought out a new cowl roof ventilator. It is designed to take advantage of the wind so as to create an induced draft. It does not revolve, but owing to its construction is open to the free access of air on all sides. The air entering the ventilator is conducted through constantly narrowing openings at a high speed and an appreciable pressure until it passes over the opening of the flue, when it expands. This forms a vacuum within the flue and the air is exhausted to the outside.

Oxygen Equipment

Manufacturers who have considerable oxygen welding or cutting work to do, frequently find it advisable to install equipment for the production of oxygen or hydrogen on their own premises. Among the concerns which have installed oxygen and hydrogen making plants furnished by the International Oxygen Co., New York, are the General Electric Co., Schenectady, N. Y., the Midvale Steel Co., Philadelphia, Pa., and the Taylor-Wharton Iron & Steel Co., High Bridge, N. J. The International Oxygen Co. also has installed a plant in Dayton for the Dayton Oxygen & Hydrogen Products Co. It is said that at the present time, the total output of oxygen and hydrogen from plants built by the International Oxygen Co. reaches over 100,000,000 cubic feet annually. The consumption of these gases in the metal trades is growing.

Pointers on Heat Treatment of Steel

What a Steelmaker Thinks of the Problems of Producing Good Machine Tool Gears

BY J. HERBERT PARKER

IN THE earlier days of machine tool construction, when carbon tool steel was used for cutting, and relatively light work was the order of the day, cast iron gears were used for transmitting power. With the advent of air-hardening tool steel and heavier work the use of mild steel gears became necessary, while today, with tools of modern high-speed steel, the use of heat-treated alloy steel gears is almost imperative. Gears of the latter class may be divided into two general groups—case-hardened gears, with a low-carbon soft center or core and a high-carbon hard exterior or case, and tempered gears which are of the same composition and hardness throughout.

Case-hardening is the process of heating a low-carbon steel, packed in a box with carbonizing material, to such a temperature and for such a length of time, that the carbon content of the surface of the steel will be increased without affecting the original carbon content of the core. The steel is then hardened, and the result should be a hard case and a soft tough core.

Case-carbonized gears may be made from four general types of steel—straight-carbon, nickel, chrome-vanadium and chrome-nickel steel, and of each of these types several modifications will be found in the market. On the whole the steels containing chromium are to be preferred, for they are freer from the tendency to lamination shown in nickel-steel, especially 3½ per cent nickel steel, and they also absorb carbon more easily, lessening thereby the length of time and expense of carbonizing. Before carbonizing, the carbon content of each type should be about 0.20 per cent, and never more than 0.25 per cent, to avoid brittleness in the teeth. The carbon in the case should be raised to about 0.90 per cent, which can readily be done by the proper selection of case-carbonizing material, and by using the proper temperature for carbonizing.

The temperature for carbonizing in general should be from 1,600 to 1,650 degrees Fahr. for all the types of steel I have mentioned. Lower temperatures do not give sufficient depth of case unless the heating operation is much prolonged. On the other hand, higher temperatures result in a case of excessive carbon content and in a core of such large grain-size that it will not respond to the subsequent heat-treatment as readily as if a temperature of 1,600 to 1,650 degrees had been used.

The heat-treatment after case-carbonizing is the most important part of the process, and upon it depend the physical properties of the finished piece. As already observed, after carbonizing we have a piece of steel with a 0.20 per cent carbor core, and a 0.90 per cent carbon case, and the object of the treatment is to put both the core and the case into the best possible physical condition. Both core and case need refining to correct the large-grained structure developed by subjecting the steel for many hours to the carbonizing temperature. Since the refining or hardening temperature of the core is about 200 degrees Fahr. above that of the case, this difference determines the most approved method of heat-treatment.

The old method of treatment consisted in quenching the piece in oil or water at the end of the carbonizing operation, right from the box, at the temperature used for carbonizing. This resulted in a large-grained core that was neither strong nor tough, and an overheated granular case which was hard, but which would not stand up in service any better than an overheated piece of tool-steel.

The first improvement on this old method was to allow the piece to cool

This paper by J. Herbert Parker, metallurgist, Carpenter Steel Co., Reading, Pa., was read before the National Machine Tool Builders' Association.

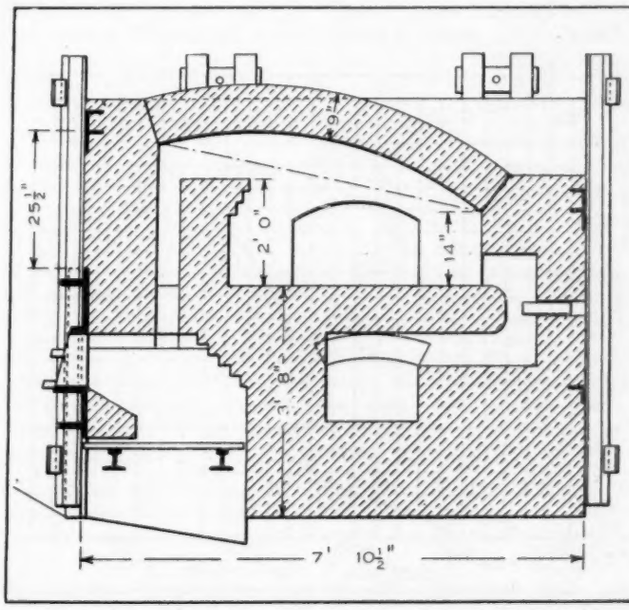


FIG. 1—CROSS SECTION OF COAL FIRED HARDENING FURNACE

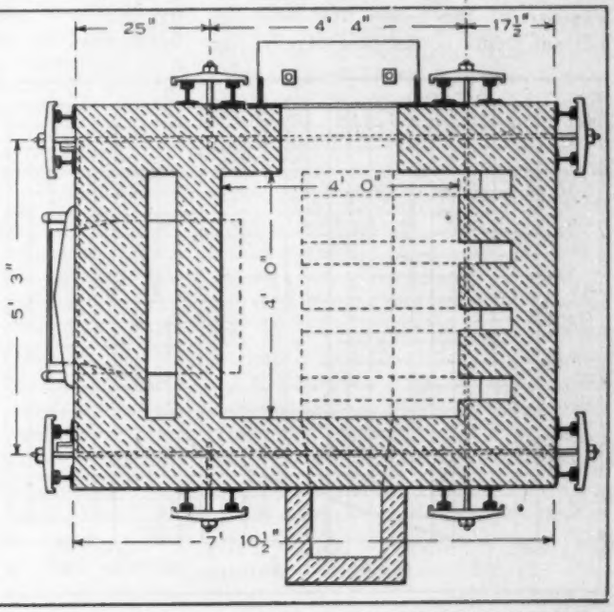


FIG. 2—PLAN OF COAL FIRED HARDENING FURNACE

in the box after it was removed from the carbonizing furnace, and then to reheat it to the proper temperature for hardening the case and quench in a suitable fluid. This procedure, however, did not develop a strong tough core.

Double Heat Treatment Necessary

The proper heat-treatment for case-hardened gears, is the so-called double treatment, by which the pieces are first allowed to cool in the box after carbonizing and are then reheated to 1,550 or 1,625 degrees Fahr. and quenched in a suitable medium to refine the core; then they are reheated to 1,350 to 1,425 degrees and again quenched in a suitable medium to harden the case; finally, they are drawn in oil at not above 400 degrees to further increase the strength and toughness of the case-hardened gear. The temperatures given are approximate only; for exact information concerning any particular steel, the user should consult the steel-maker.

There are many case-carbonizing compounds on the market, and most of them have some merit. Those of bone are probably the least desirable, owing to lack of uniformity, which results in uneven carbonizing. The most desirable are those consisting of definite mixtures of carbon and carbonates; they carbonize uniformly, and most of them can be used repeatedly without losing their power of giving up carbon to the metal. As carbonizing is done in boxes, where volume determines the amount of carbonizer used, it is obvious that large bulk per unit weight is desirable.

The wear and tear on carbonizing furnaces, the fuel consumed, and the expense of the boxes are three important items in the cost of case-hardening. In many cases it is entirely possible to reduce all these items by the use of a cored instead of a solid box, as shown in Fig. 3. The proper proportions, of course, will vary with the work to be done, but if the general idea is worked out for each specific instance, it will be found not only

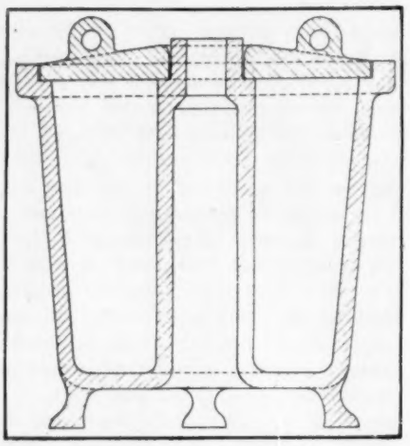


FIG. 3—CORED CARBONIZING BOX

that the cost of carbonizing is diminished, but that more uniform carbonizing is accomplished.

Tempered Gears Better

For machine tools tempered alloy-steel gears appear preferable to case-hardened gears for a number of reasons. Unlike case-hardened gears, they are of uniform carbon-content throughout, and when hardened have a uniform hardness throughout the tooth-section. The steels used for tempered gears are of three general types—silico-manganese, chrome - vanadium and chrome-nickel steel, the last named in its several modifications, being by far the most used. The carbon content varies for the different types, from 0.40 per cent to 0.60 per cent. The heat-treatment of all these types is simplicity itself, consisting merely in heating the gear slowly and uniformly to the hardening temperature, which is usually about 1,500 degrees Fahr., and quenching in oil, after which it is drawn in an oil bath. The result is a strong, tough, dense-grained steel gear which has been used with marked success in motor car work, and which is fast replacing soft steel and case-hardened gears in machine tool construction. Viewed from the standpoint of physical properties in the finished gear, the evolution in gear material from cast iron to tempered steel may be seen in Table I, presented herewith on page 773.

Advantages of Tempered Gears.

Physically, tempered gears are stronger and tougher and should therefore be better able to resist sudden impacts and extraordinary loads than case-hardened gears. Tempered gears do not show by file and scleroscope test the same degree of hardness as case-hardened gears, but nevertheless with proper design, the dense-grained tempered gear-tooth resists wear most satisfactorily, as was demonstrated recently by the examination of a motor car transmission that had covered over 100,000 miles. The tempered gears in this car still showed the original tool marks. Not long ago a designer of machine tools remarked upon the apparent softness of some tempered gears, but found after several months of hard service that they still showed their tool marks, thus proving a hardness ample for wear.

In service, especially for clash purposes, the superiority of tempered gears is most marked. On the clash

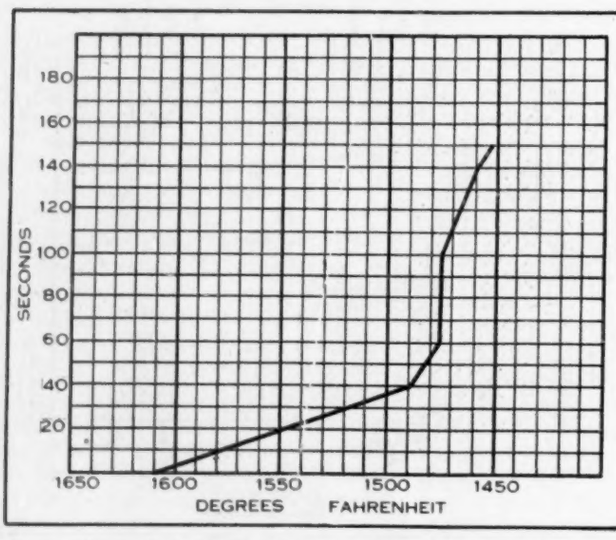


FIG. 4—DIAGRAM SHOWING THE CALIBRATION OF A PYROMETER WHICH IS CORRECT

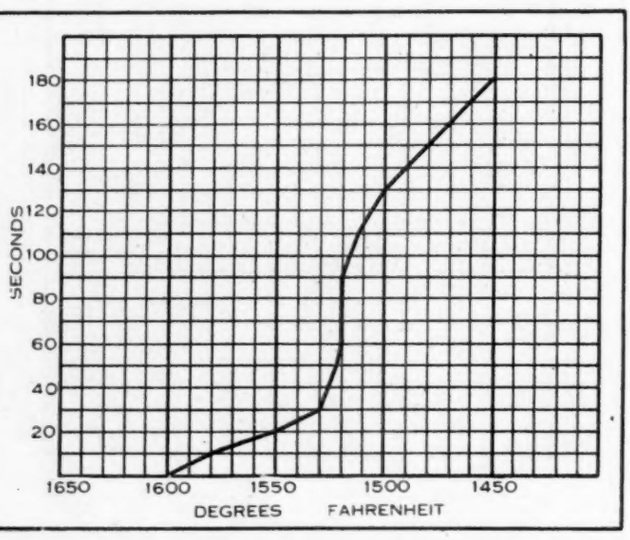


FIG. 5—DIAGRAM SHOWING A PYROMETER WHICH READS 45 DEGREES TOO HIGH

faces, case-hardened gears are liable to have the hard case chipped off, thereby exposing the soft core to impact. The hard chips fall into the gearing and may find their way into bearings with resultant troubles. Tempered gears with a uniform hardness throughout, do not chip.

With all heat-treated gears, little points in design are important. Gear-teeth should not be undercut, for if the section at the root line is smaller than at the pitch line, greater hardness and brittleness are produced where least desired. Great differences in section should be avoided wherever possible, so as to do away with excessive warpage. Sharp edges and sharp re-entrant angles, even in keyways, are the cause of internal hardening strains which frequently result in failures; hence wherever possible a fillet should be used in place of a sharp angle.

When heat-treated gears are suggested to the machine tool builder as a remedy for some of his troubles, and as a means of eliminating a possibly large item for replacements and repairs, one of his first questions naturally is, of what does a heat-treating equipment consist? Usually, the second question is, what will it cost? The first item in equipment is a furnace. There are offered for sale a number of types of gas and oil-fired furnaces. The price of fuel oil has almost driven the oil fired furnace from economic use. Coal and coke, however, are available everywhere, and I desire to submit for consideration a furnace fired with this kind of fuel. It is illustrated in Figs. 1 and 2. Anthracite, bituminous coal and coke work equally well. When bituminous coal is used, the consumption with ordinary firing should not exceed 500 pounds in a 24 hour day. The cost of this furnace depends somewhat upon the price of labor, but should not exceed $300.

The next item is a suitable quenching medium. Running water with a suitable tank is always necessary in a hardening room. To take the chill from the water in the winter or raise the temperature a little at any time, a jet of live steam in the incoming water pipe will be found very convenient. Heat-treatment of alloy gear steels, however, requires an oil bath, the size of which will depend entirely upon the amount of work to be quenched and the facilities for keeping the oil cool. The kind of oil best suited for oil-hardening was the subject of an investigation conducted by the laboratory of The Carpenter Steel Co., Reading, Pa., with the following results, comparison being made with water as a standard:

Kind of oil.	Hardening quality.
Water	1.000
Mineral No. 1	0.2409
Mineral No. 10	0.2304
Corn	0.1927
Mineral No. 2	0.1607
Cottonseed	0.1606
Fish	0.1490
Rosin	0.1350

For hardening, several of the mineral oils are manifestly more effective than fish and cottonseed oils, which for a long time were looked upon as the best oils for this purpose. Mineral Oil No. 1 has a specific gravity of 0.860, a flash-point of 420 degrees Fahr. and a viscosity of 170 seconds at 100 degrees Fahr., as shown by the Saybold viscosimeter. A mineral oil to this specification can be bought very cheaply. Oil can be cooled by blowing cold air through it, or by pumping it through a coil of pipe immersed in cold running water, thus maintaining a circulatory system which admits cool oil at the bottom of the hardening tank and pumps the warm oil from the top through cooling coils back to the bottom. When air is used, care should be taken to avoid an excess during the quenching of a piece, for if air instead of oil were to constantly strike the piece, uneven hardening might result.

Table I.

Evolution of Gear Material

Material.	Elastic limit lbs. per sq. in.	Hardness Scleroscope.	Toughness Guillery impact Kilogrammeter.
Cast iron	20,000	25	*
Soft steel	40,000	35	2.0
Case-hardened steel (average test of alloy steels)	120,000	85	2.5
Tempered steel (average test of alloy steels)	225,000	75	5.0

*Negligible.

The next equipment item is a drawing bath. This may consist of oil, lead, or a combination of salts, contained in a cast iron or steel vessel. The container is usually of very simple design, and may be fired by gas, oil or coal. The oil should be a mineral oil with a flash point of not less than 600 degrees Fahr., this temperature usually being sufficient for all temper-drawing purposes. If higher temperatures are desired, a mixture of two parts potassium nitrate and three parts sodium nitrate may be used which melts at 450 degrees Fahr., and may be used up to 1,000 degrees Fahr., or lead which melts at 630 degrees. To indicate the temperature of the bath, a mercury thermometer should be used rather than a pyrometer, for most pyrometers will show considerable error at drawing temperatures under 800 degrees.

The last item is a pyrometer. There are a number of good thermo-electric pyrometers on the market, and more depends upon the care taken of the instrument than upon the selection of any particular make. A few rules for the use of the pyrometer and a simple method of calibration will be interesting.

First.—Keep the hot end of the thermo-couple as near the work as possible; do not put it through the furnace wall or roof, exposing the end to the direct heat of the flame, but place it so that it attains, as nearly as possible, the same temperature as the work.

Second.—Keep the cold end of the thermo-couple protected from the direct or radiating heat of the furnace, that is, keep it cool.

Third.—Protect the voltmeter by a dust-proof case, and place it on a support free from vibration.

Fourth.—All switches should be of the wiping-knife type. Improper contact at the switches is a prolific source of error, and such errors are not readily located.

Fifth.—Carefully check all thermo-couples as soon as they are received from the manufacturer, and before putting them into service. Adhere closely to this rule, instead of assuming that new thermo-couples are sure to be correct; nor, for the same reason, should new thermo-couples be used in blind faith for checking since they occasionally show a considerable error, and any one making use of them as standards will sooner or later come to grief.

Sixth.—Carefully standardize each pyrometer at definitely stated intervals—at least once a week, and as much oftener as possible. Frequent calibration is a matter not of convenience but of necessity.

How can the calibration of a pyrometer be accomplished readily and accurately without the use of an extensive laboratory equipment? To this question of immediate interest in every hardening room I would answer that the easiest and most convenient method is that based upon determining the melting point of common table salt, sodium chloride. Chemically pure salt, which is neither expensive nor difficult to procure, should be used where accuracy is desired. The salt is melted in a clean crucible of fire-clay, iron or nickel, either in a furnace or over a forge fire, and then further heated until a temperature of about 875 to 900 degrees Cent. is attained. It is essential that the cruci-

ble be clean, because a slight admixture of a foreign substance might noticeably lower or raise the melting point. The thermo-couple to be calibrated is then removed from its protecting tube and its hot end is immersed in the salt bath. When this end has reached the temperature of the bath the crucible is removed from the source of heat and allowed to cool, and while cooling, readings are taken every 10 seconds on the voltmeter. A curve is then plotted by using time and temperature as co-ordinates, and the temperature of the melting-point of salt, as indicated by this particular thermo-couple, is noted at the point where the temperature of the bath remains temporarily constant while the salt is freezing. The

(*Continued on page* 792c.)

Business Men Should Retaliate

GOVERNMENT, it is stated in a recent issue of *Drill Chips*, issued by the Cleveland Twist Drill Co., Cleveland, is the business of the whole nation. There is nothing more important to our destiny, as a nation, than that it be influenced and guided by the whole people who are to be governed. On this condition our collective progress has its foundation.

We have been and are now confronted with the sorry spectacle of the havoc wrought by a departure from this principle. Permitting our national life to be controlled by legislative bodies, 90 per cent of which are lawyers, has produced an intolerable situation demanding the most drastic measures if relief is to be had. The profession of law is a useful one, it is an ancient one, and it is usually an honorable one, but this is essentially a commercial nation and the marvelous industrial development it has attained is eloquent testimony to the inherent virility of its business life. A surfeit of legislation by and for lawyers, devoid of even rudimentary business training or judgment, has impeded our progress mightily and whatever eminence has already been acquired has been in spite of obstacles consistently and diligently imposed. Whatever may be said of Germany, her philosophies and ambitions, the fact remains that her most prominent commercial position was acquired by efficient and helpful co-operation of the government with the business interests. Commercial enterprise was encouraged instead of hindered and the result was a more rapid industrial development than the world had ever before known. To maintain our rightful position, by reason of our resources, facilities and limitless ingenuity, are we to be compelled to adopt a monarchial form of government? That ought not be necessary, although it might be vastly better for all of us, and certainly it would not bring about a more chaotic condition than now obtains.

Without entering into the relative merits of the various forms of government, can we not take the one we have inherited and which presents so many beneficial possibilities, and look for some remedy to right its wrongs? We, as the governed, must be judged by the governing body we have installed or silently permitted to be installed. In any case, where the shortcomings are so patent, where the iniquity is so obvious and the remedy so apparent, some measure to correct the deficiency ought to be applied, if we are not content to languish under a costly indictment of our much mooted resourcefulness.

Political life as it now exists offers no attraction to the capable business man. The ways of politics are not the ways of business. Efficiency, economy, and honesty are virtues almost unknown to those making and administering our laws. In their place our academic rulers have substituted extravagance, padded pay-rolls, conscienceless squandering for useless waterways and other public works, and when all else fails there remains the highly diversified pork-barrel. If a business man attempted to conduct his institution along the lines his government has fashioned and adopted, his competitors would force him into bankruptcy and possibly into jail.

Through assiduous effort to distract attention from his own motives and purposes the demagogue has been hurling mud at the business man, the employer of labor, for so long that the public has come to attach some importance to the charges; especially as the business man has not seen fit to retaliate or defend his name in any way. Without doubt there have been rogues in commercial pursuits, just as there have been in the professions, but in the former case the muck-rakers, professional reformers and the yellow press, have sought to use the isolated case as an illustration of business methods as generally practiced. The plain fact of the matter is that the whole fabric of our civilization depends upon our business men. The charitable work of the world as well as education and religion are supported by the business man and thousands —the whole unthinking masses—are dependent upon his enterprise and sense of responsibility. The ethics of business are well recognized and of a high moral character and were they injected into politics they would purify public service and make this the high calling that it should be, but unfortunately isn't.

We are suffering from too much law. We need less theory and more of the mature judgment that can only come from business experience and training. We need efficiency and ordinary everyday honesty. We are not getting these things from the class of men to whom we have entrusted our national welfare. They have had their chance and that business has survived at all under the burdens prescribed is not due to a lack of zest in the attempts to founder it. Business, so far, has lacked organization—the kind of organization that will project business experience and business ideas into the council and the administration of public affairs. There is a desperate need for the judgment and experience of the man of business. To attain this desirable end the business man must take hold and assert himself, for his own protection if for no more altruistic purpose. Those now in power will not willingly abdicate. They must be forced by organized business effort, supported as it will quickly be, by the public which now sees the effects of business depression. Surely our salvation as a representative government is worth a change of diet, whatever inconveniences that process may entail.

The E. J. Longyear Co., Minneapolis, Minn., has issued a bulletin covering its facilities for prospecting and drilling iron ore bodies. The methods of drilling for ore and the equipment used are described and illustrated. Information also is presented on the methods of making the results of drilling visible by means of cross sections and transparent models.

The Burd High Compression Ring Co. has moved its general offices from the Masonic Temple to 307-309 South Main street, Rockford, Ill. This change was made necessary on account of increased business demanding new and more commodious office facilities.

News of Employers and Employes

Principal Provisions of the Employes' Compensation Bill Pending in the Pennsylvania Legislature

Thomas A. Baldwin, a member of the Engineers' Society of Pennsylvania, has prepared a synopsis of the workmen's compensation act now pending for the state legislature of Pennsylvania and has drawn up an interesting table comparing the main features of the various state compensation laws now in effect. His article is published in the March *Journal* of the society.

Among the 23 statutes of this country will be found many varieties, indeed no two are identical, says Mr. Baldwin. They differ in methods of election, administration, scale of compensation, method of insuring risk, etc., but all embodying the fundamental principle of compensating the injured workmen without recourse to long litigation and regardless of fault.

The following, briefly outlines the main features of the Pennsylvania bill:

Article I

Act applies to all accidents occurring within the commonwealth.

Article II

Damages by action of law.

In action to recover for damages following injury or death, the employer shall not avail himself of the common law defenses:—(a) negligence of fellow servant; (b) assumption of risks; (c) contributory negligence — reckless indifference and intoxication, exceptions.

Article III

Elective Compensation—

After Dec. 31, 1915, election presumed unless notice in writing is given by employer or employe and copy filed with bureau, which notice operates as a surrender of all the benefits of compensation law.

Notice of termination of agreement must be given and copy filed with bureau 60 days prior to accident.

Unless employer satisfies compensation board of his ability to carry his own liability he may insure in one of the three following methods:—(1) state workman's insurance fund; (2) with some authorized liability company; (3) with some authorized mutual organization.

Schedule of Compensation

Total disability 50 per cent, wages of 500 weeks. Maximum $10.00, minimum $5.00 per week.

Partial disability 50 per cent difference earning capacity for 300 weeks. Maximum $10.00 per week.

During first 14 days following injury no compensation paid, but employer must furnish reasonable surgical and medical aid, maximum cost $25.00, unless major surgical operation necessary, when maximum is $75.00.

Permanent injuries such as loss of legs, feet, hands, eyes, etc., carry definite remuneration, i. e., number of weeks compensation must be paid.

Distribution of compensation following death varies in accordance with number and kind of dependents, i. e., widow 40 per cent of wages with 10 per cent additional for each child, with a maximum of 60 per cent for 300 weeks; wages for death compensation minimum $10.00 a week, maximum $20.00 per week. When there are no dependents reasonable expenses of last sickness and burial not exceeding $100.00 is paid to the representatives of deceased.

Article IV

From the workmen's compensation referee's decision an appeal may be made to board, whose findings shall be final, except in questions of law, from which an appeal may be made to the courts of common pleas of county in which accident occurred. All agreements regarding compensation between employer and employe made before expiration of 14 days following accident, or contrary to provisions of act, shall be declared null and void.

Bureau of Enforce Act

Administration of law is placed directly under the department of labor and industry through the workmen's compensation board, a board of three members appointed by commissioner of labor and industry with approval of governor.

Board shall divide commonwealth into districts supervised by referees approved by board.

Act Creating State Insurance Fund

Authorizes the establishment of a state insurance fund, which in reality is a mutual insurance association managed by the state treasurer, insurance commissioner and commissioner of labor and industry.

System provides that each year's premiums be sufficient to carry to maturity all payments of compensation incurred through accidents of that year.

Board shall yearly, Oct. 1, prepare and publish schedule of premiums for employers accepting act.

Mutual Liability Insurance

Twenty or more employers aggregating not less than 5,000 employes may form a mutual liability insurance association for purpose of insuring themselves against liability payable under this act. Such associations to be supervised by the commissioner of insurance.

Nothing contained in act shall apply to persons who at time of accident were engaged in domestic service or agriculture.

Fifth Furnace Sold

The Snyder Electric Furnace Co., 53 West Jackson boulevard, Chicago, has received an order from the Daimler Motor Car Co., of England, for an electric furnace having a daily capacity of four tons. This furnace will be operated on a refining basis and will melt cold material. This is the fifth Snyder furnace sold in Europe in the last two months.

The Daimler Motor Car Co. at present is manufacturing aeroplanes for the British government in addition to its line of automobiles and motor trucks. The steel supplied by the Snyder furnace contracted for will be used in the manufacture of castings for aeroplane motors.

G. J. Stock, formerly manager of the Stock Oil Fired Converter Co., has disposed of his interest in that company and now is English representative for the Snyder Electric Furnace Co., with headquarters at Darlington, Eng.

J. Earl Myers is now in charge of the Pittsburgh office of the Whitney-Kemmerer Co., succeeding Chas. S. Bygate, resigned, who, with George W. Theiss, is carrying on the buying and selling of coal and coke under the name of the Theiss-Bygate Co., Oliver building.

The Tilghman-Brooksbank Sand Blast Co., Philadelphia, has received a large order for sand blast equipment from the Locomobile Co. of America, Bridgeport. The order embraces complete equipment for three sand blast rooms.

Business News of Nation's Capital

Government Argues That Great Power Alone Justifies Dissolution of a Corporation, Such as Harvester Company

Washington, April 13.—Keen interest was displayed among attorneys and business interests generally in the arguments last week before the supreme court of the United States in the International Harvester Co. case. Members of the federal trade commission were among those in attendance. Attorneys for the company appear to be confident that the highest tribunal will reverse the decree of the circuit court for the eighth circuit of Minnesota that the company violated the Sherman anti-trust law, from which Judge Sanborn, one of the three judges of that court, dissented. Attorneys for the government, on the other hand, have denoted a similar confidence and it has been indicated they found cause for gratification in the line of questioning by judges of the supreme court directed at counsel for the corporation. Justice McKenna engaged Attorney John P. Wilson, counsel for the defendant, in a lively argument as to whether it was not the object of the government's suit to restore competitive conditions such as existed before the consolidation of the five companies into the International Harvester Co. in 1902. It was asserted by Mr. Wilson that it would be impossible to restore competition as it existed before the combination, because the five companies have "disappeared and could not be made to reappear." The company was strongly defended on the ground that it had not been proven guilty of unlawful trade practices, that it has not advanced prices, but has developed the foreign market and done many other things which could have been performed only through merging.

Attorneys for the company filed a printed reply to the government's brief asserting that the government has asked that the Standard Oil Co. decision be set aside, and that the court held that a combination having a preponderant proportion of business secured by purchase of competing concerns be declared unlawful. Argument thus presented a new doctrine which the government would substitute for the "rule of reason".

"We may concede that large aggregations of wealth in the capital of corporations may become a social or political evil, but congress has not legislated against such an evil," the reply declared.

Following the assertion that large aggregations of wealth were not forbidden by the Sherman anti-trust law, it pointed out that the federal trade commission act and the Clayton anti-trust act "evidenced an intention, not so much to disturb the ownership of property, but to enjoin the means by which large concerns might seek to eliminate competition."

Attorney General Thomas W. Gregory outlined the government's position and Solicitor General John William Davis supported its attitude by an argument as to the law and its application to the facts. It was urged by the government that power arising from the preponderant position of the Harvester company acquired by an alleged illegal combination and the elimination of competition demanded dissolution. Mr. Gregory said that unless the government possessed the right to dissolve a corporation under such conditions, trust legislation had been a useless thing. Contention was made by Mr. Davis that the government's attitude was not a new one, and quoted supreme court decisions and arguments of the government's representatives in other cases, including Attorney Frank B. Kellogg, now appearing for the Harvester company, to support his claim.

"The charge of preeminence has been sustained, but the charge of monopoly and oppression has wholly failed," said Attorney Edgar A. Bancroft, general counsel for the defendant.

The Harvester company, if unmolested, said Mr. Davis, would strike from the Sherman law its social and political significance and restrict its economic effect to a prohibition against raising prices.

"Its attorneys forget," he said, "that the Sherman law was passed because 'kings were being set up to rule the country's commerce'."

Hope is entertained that the supreme court will render a decision in the not distant future.

Report Delayed

Washington, April 13. — William Blackman and James A. Smyth, department of labor conciliators who rendered services in connection with the strike of sheet and tin plate employes in the middle west, may not be ready to submit their report to Secretary of Labor William B. Wilson for 10 days. Mr. Blackman is engaged in attempting to settle other strikes, and it is also believed delay in making the report is partly due to the feeling that the services of Mr. Blackman and Mr. Smyth may again be needed on account of the dissatisfaction of Wheeling, Va., members of the Amalgamated Association.

Charge for Spotting

Washington, April 13.—Arguments will be made next week before the interstate commerce commission in the matter of proposed charges by the railroads in official classification territory for spotting cars. The proposed charges are 5½ cents per ton, with a minimum of $2 per car. Vigorous protest is being made by manufacturing interests generally against the tariffs, which are under suspension until April 29.

Perhaps the strongest brief that has been filed against the proposed tariffs is that for the Carnegie Steel Co., the American Bridge Co., the American Sheet & Tin Plate Co., the American Steel & Wire Co. and the National Tube Co. It is an illuminating discussion as to the effect the charges would have on the subsidiaries of the United States Steel Corporation specifically and the steel industry generally.

After charging that the proposed tariffs are unreasonable, unduly preferential and unjustly discriminatory and in violation of the act to regulate commerce, the brief says the protestants have suffered many advances since 1901, and without corresponding advances on other commodities. Rates on iron and steel products, it is claimed, have always included and do include the expense of performing spotting service. The brief sets forth that railroad equipment is quickly released by steel industries, and that therefore the railroads escape payment of 90 cents per diem per car.

Figures are cited to support the claim that the tariffs discriminate against the iron and steel industry. Attention is directed to the fact that there are 7,189 industries at junction points of the Pennsylvania Co., not including the Panhandle, and that, of this number, the carriers have published spotting charges at 105 industries, 95 of which are listed under the caption "Iron and Steel". At Trenton, N. J., it is stated, only two industries, both of them iron and steel plants, are included in spotting tariffs, despite the fact that there are many

Business News of Nation's Capital

Chamber of Commerce Committee Considers Business as Related to Policy of the Federal Trade Commission

industries having spur track connection there.

Railroad earnings for carrying iron and steel products are asserted to be much greater than for transporting the average commodity. Iron and steel commodities produced in the Pittsburgh, Cleveland and eastern Ohio districts, it is stated, yield 26.7 cents per car mile, while the average yield on all other commodities, including those under discussion, is 16 cents.

The increase in freight rates on iron and steel products and raw materials, since 1900, with the exceptions noted, is given as follows:

Coke, Connellsville to Pittsburgh, 25 per cent; pig iron, Pittsburgh to various places, 15 to 26.7 per cent since Feb. 1, 1901; billets from Pittsburgh, 5.3 to 26.4 per cent since Feb. 1, 1901; iron and steel articles from Pittsburgh, 6 to 37 per cent; limestone, 8.4 to 26.6 per cent.

Commission's Policy

Washington, April 13.—Matters dealing with the general situation of business as it relates to the federal trade commission were discussed here last Wednesday at the meeting of the federal trade committee of the chamber of commerce of the United States. The committee was formally organized and later on it will call upon the federal trade commission and hold a conference, said Guy E. Tripp, a member of the committee, and chairman of the board of the Westinghouse Electric & Mfg. Co.

It was the unanimous sentiment of the committee that no action should be taken by it pending the conference which the federal trade commission has arranged for next Saturday. All of the members of the committee agreed that it should offer its services to the federal trade commission and endeavor to reach through the initiative of the commission a plan of co-operation.

The committee is composed of the following:

Harry A. Wheeler, Chicago, chairman, vice president of the Union Trust Co.; Rush C. Butler, Chicago, member of the law firm of Butler & Lynde; Joseph P. Cotton, New York, member of the law firm of Spooner & Cotton; Alfred B. Koch, Toledo, president of the La Salle & Koch Co., and president of the National Retail Drygoods Association; W. L. Saunders, New York, president of the Ingersoll-Rand Co.; Henry R. Seager, professor of political economy in Columbia University, New York; Alexander W. Smith, Atlanta, Ga., of the law firm of Smith, Hammond & Smith; Guy E. Tripp, New York, chairman of the board of directors of Westinghouse Electric & Mfg. Co., and I. C. White, Morgantown, W. Va., state geologist.

Just what the attitude of business interests generally throughout the country is toward the commission is perplexing Washington. If most comment of newspapers and periodicals is to be accepted as a true criterion, it would seem evident that business is either actually hostile or indifferent to the commission. Despite that, however, the commission, it is believed, feels that it possesses a good feeling on the part of business and that judgment toward it is being suspended until it has actually begun its duties.

Perhaps the commission bases such an opinion on experience it has had by way of coming into contact with business men through conferences, some of them participated in by representatives of the steel industry. It has been indicated at the commission offices that these business representatives not only are not hostile or indifferent toward the commission, but on the contrary are cordially in sympathy with its purposes. Both so-called "big business" and "small business" have been represented at these conferences, the principal interests being the steel, lumber and coal mining industries. The names of the business men and the nature of their conferences will not be disclosed by the commission for the present at least. It is asserted that, responding to the announcement made by Chairman Joseph E. Davies of the commission that the commission will always be glad to confer with business men, a number of the latter from all parts of the country who have come here are said to be gratified at the treatment accorded them by the commission. They are declared to have left with the belief that the commission is trying in every way to co-operate with business, or, in the terms of the White House statement of some time ago, to be a body of "constructive helpfulness".

The interviews held with the commission were entirely informal, but are said to have related to subject matter which may later be made the basis for formal complaints. A report that in almost all instances claims were made that the representatives were facing unfair methods of competition could not be verified in the slightest degree, nor could a denial be obtained.

Business men have been invited into the conference room of the commission with only the comissioners present, no stenographic reports of the conferences being made, although stenographers have been occasionally furnished after conferences where business men desired to dictate to them statements to be filed with the commission.

The commission may complete within two weeks its administrative details, including such matters as taking over the old bureau of corporations, absorbed by the commission, and by that time a tentative draft of the rules of procedure may be prepared. The commission hopes to receive formal complaints and to hold regular hearings before June 30, when the fiscal year expires. Business practices at home will be taken up first, according to the plans now proposed, although a revision of these plans may be made, the most important cases to be given precedence and discussed informally.

It is the intention of the commission to make the rules of procedure as simple as possible in order to eliminate "red tape," and save expense and to give business interests an opportunity to submit their cases in a direct manner.

Wire Decision

Washington, April 13.—The treasury department last week rendered a decision that wire strand or wire cable shall be classified with wire rope in the future and take an import duty of 30 per cent ad valorem instead of 15 per cent. The decision was made as the result of a question raised by the collector of customs at Ogdensburg, N. Y., in relation to certain steel wire cable, which had been assessed at the rate of 15 per cent under paragraph 114 of the Underwood-Simmons tariff act, as a manufacture of wire. The same paragraph provides a duty of 30 per cent on wire rope. The cable under discussion consisted of 12 wires twisted around a core made of seven wires twisted together. It was evidently the treasury's interpretation of paragraph 114 that the 15 per cent duty pertained to wire strands or wire cable when coated.

Urged to Get Together

In Carrying on Foreign Business—Dangers of Manufacturers Becoming Involved in Many Troubles

Editor of *The Iron Trade Review*:

The increasing number of inquiries for war munitions which are flooding the country and putting our manufacturers to an endless expense in the preparation of estimates and the following up of prospective work makes one pause in the contemplation of this mass of new business and wonder if our much vaunted American principles of efficiency are exercised as thoroughly as they should be.

The situation which presents itself to a conscientious manufacturer when an inquiry comes before him can be partially summed up in the following statement:

First.—He receives a duplication of the same inquiry from a score of different sources.

Second.—He finds that many of his salesmen are dealing through agents and not with direct representatives of foreign governments.

Third.—The specifications he receives are often incomplete, incorrect and impossible.

The shrapnel and high explosive shell situation probably represents at the present time the worst condition of chaos in the line of war supplies.

All of the standard shells of Russia, England and France are different in specification and the data supplied are usually incomplete. In many cases, the government officials themselves do not know of the inconsistencies in the information given out.

The matters of governmental inspection and testing are new to a majority of our manufacturers and in their estimates the cost of a number of these items is either guessed at or omitted entirely.

In short, the situation at present is a disgrace to the trade and an impediment to the art. It would seem that the present situation, now serious, will soon become more so if some "stand-together" policy of the American manufacturer is not promptly adopted. Already the raw and finished material markets in various fields are demoralized. There has been an increase in the cost of machine tools which has been considerable.

The speculative craze due to the desire of the public to buy stocks of companies manufacturing war materials has destroyed the bond market and impaired the ordinary demand for substantial stable stocks.

These conditions, we feel, are in a great measure due to the wild rush after war orders and the following up of the many hypothetical inquiries which have been disseminated throughout the country, which in many cases will amount to nothing.

Setting aside for a moment the objection to a possible combination in restraint of trade as governed by the Sherman law, it would seem that for the matter of mutual protection and helpfulness there should be formed immediately an association of manufacturers either separate from, or composed of, members of the American Manufacturers' Association. This organization to collect, compile and disseminate correct and complete information which will give to our several manufacturing industries the advantage of knowing what they are trying to make, how they will make it and of what material they shall make it.

If such an organization or clearing house of information could be formed, our manufacturers would not now be at the mercy of the foreign buyer and indiscriminate agents, but would be able to stand firmly in their position when once taken, knowing that if they did get an order, there would be no doubt as to what they were going to manufacture and the question of an honest profit would be undisputed.

The clearing house, if formed, should have charge of the following:

First.—The obtaining from official sources correct and complete specifications of the various articles and supplies to be furnished.

Second.—All inquiries from whatever source to be first sent to the association and no quotations to be made upon these inquiries unless approved by the association after investigation proves them to be authentic. Duplication of inquiries to be eliminated.

Third.—Investigation and determination of terms of payment.

Fourth.—Investigation and determination of the manner and means of making the various inspections and tests called for and required.

Fifth.—Make recommendation as to standards and test gages to be used.

Sixth. — Procure and distribute information required by manufacturers as regards various supplies, chemicals, etc., which they may require in the fulfilling of contracts.

Seventh.—Determine and agree, if possible, upon certain cost rates for carrying out various processes of manufacture, such determination being subject to the decision of a conference of the manufacturing heads of concerns in the association.

Eighth.—Specific directions as to painting, packing and shipping would be prepared.

If the plan as above described were only partially carried out, we believe it would bring about the following results:

First.—The nervous commercial unrest that is spreading over the country would settle down to calm and careful consideration of the facts and accurate information in hand.

Second.—A large amount of expense would be saved by doing away with the following up of unreliable inquiries and incorrect information.

Third.—The material markets and the machinery market would be kept stable.

Fourth.—Information as to methods and processes of manufacturing would be obtained by all at minimum cost.

Fifth.—The financial situation as to terms of payment, etc., etc., could be kept in control and losses could be avoided due to poor judgment and lack of experience, and oversight.

Sixth.—An honest profit would be assured to the American manufacturer.

Charles S. Powell, Mgr.
Factory Appliance Co.
711 Illuminating Bldg., Cleveland, April 8, 1915.

Will Raze Trenton's Iron House

Trenton, N. J., April 13.—Trenton's "iron house", the only one of its kind in the country, will shortly be razed to make room for an addition to the plant of the John E. Thropp's Sons Co., machinist. The house has been occupied for many years by Peter D. Thropp, treasurer of the concern. In 1850, Bottom, Tiffany & Co. established an iron foundry on the banks of the Delaware canal. One of the products of the firm was iron fronts for buildings, and Mr. Tiffany decided that a good advertisement would be to build a house entirely of iron. Accordingly he built it. During the civil war the cupola was painted red, white and blue.

Property of the Best Mfg. Co., at Twenty-fifth and Railroad streets, Pittsburgh, has been transferred to E. W. Mudge, head of E. W. Mudge & Co., that city, and others. The Best company is now connected with the Kennedy-Stroh Corporation, and the Best department is at Oakmont.

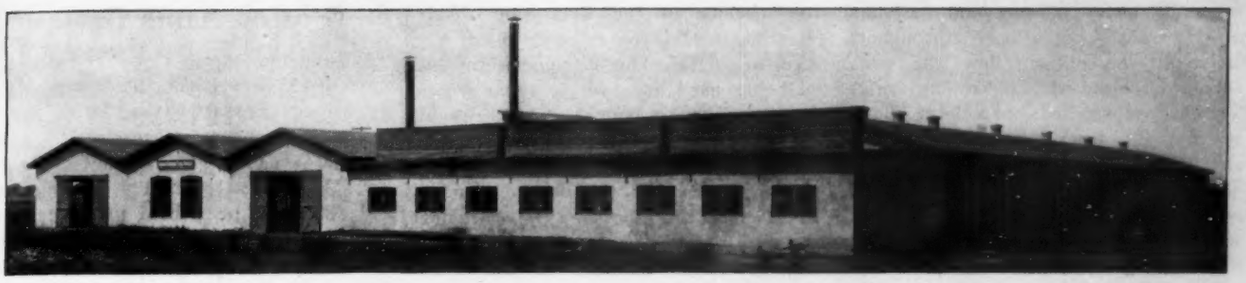


Fig. 1—General exterior view of the Schwartz-Hermann Steel Works, Inc., Somerville, N. J.

Rolling Strip Steel in New Jersey

Description of New Plant of Schwartz-Hermann Steel Works Equipped With Interesting Cold Rolling Machinery

BY C. J. STARK

A REMARKABLE expansion in the manufacture of metal novelties and stampings in this country in recent years has resulted in a large increase in the demand for cold-rolled strip steel, wire and other products of the cold-rolling mill. A familiar form of this development in recent years is the manufacture of blades for safety razors. One of the large makers of phonographs requires a surprising tonnage of strip steel monthly for the springs used in the operation of these machines. In stamping work, the variety of specialties produced from cold rolled steel are as varied as they are numerous.

A new plant for the cold rolling of steel for use in the production of miscellaneous novelties has been erected and put in operation at Floral Park, Somerville, N. J., by the Schwartz-Hermann Steel Works, Inc., a recently-formed company with offices at 119 Nassau street, New York City. This company has been formed by American capital and is chartered under the laws of New York The works has been in operation since November. Construction work was begun last June but the completion was delayed pending the arrival of certain machinery from abroad.

The plant consists of three buildings, all closely connected. The rolling mill department is 100 x 200 feet; the annealing and stock building, 100 x 150 feet; and the cleaning room 25 x 100 feet. The buildings are constructed of hollow tile. furnished with stucco both within and without. The saw tooth roof construction and the liberal use of side lights in the rolling mill department, render the working floor unusually bright and airy. At the present time the plant has a production of 125 to 150 tons monthly, but plans now are being carried out to increase this output.

One of the features of the plant is its equipment of rolling mill and auxiliary machinery of German type. This machinery was furnished by the Rheinische-Walz Maschienfabrik of Cologne, Germany. There are in operation at the present time, four 8-inch mills with a capacity for rolling strips up to 6 inches wide by ⅛-inch thick and six 6-inch mills for rolling up to 3½ inches wide by 1-16-inch thick. The mills have a capacity for fine rolling down to 0.001-inch gage. Elimination of vibration in cold rolling is essential to insure trueness of gage in the finished product. To serve this purpose, the German mills have been designed with

FIG. 2—VIEW OF THE ROLLING MILL DEPARTMENT OF THE PLANT, SHOWING 6-INCH MILLS OF GERMAN TYPE IN FOREGROUND. MILLS WERE NOT CONNECTED FOR OPERATION WHEN THIS VIEW WAS TAKEN

FIG. 3—ANOTHER VIEW OF THE ROLLING MILL DEPARTMENT, SHOWING 8-INCH MILLS IN FOREGROUND. THIS VIEW WAS TAKEN BEFORE MACHINERY WAS CONNECTED WITH MOTOR

especially heavy housing and base and are liberally proportioned throughout. In type, the mills follow the usual standard lines of cold-rolling units. They are controlled by a lever clutch so that the work may be started or stopped by the operator at any point. The flats are fed into the rolls by a workman from reels and the finished strip is wound automatically on reels on the finishing side of the mill.

The mills are arranged in pairs. The eight-inch stands are belt-connected to an overhead shaft which is driven by a 50-horsepower Crocker-Wheeler alternating current motor. The 6-inch mills are connected by belt and line shaft to a second 50-horsepower Crocker-Wheeler motor. The current is furnished by a public service corporation at 220 volts, alternating. The company is planning to install in the near future a 12-inch continuous mill of American type for rolling heavier material. This mill will consist of two stands and will be operated by a 100-horsepower motor.

The rough stock now being worked up by the company is chiefly basic open hearth steel of mild quality, running 0.10 to 0.12 in carbon. This is furnished by the Carnegie Steel Co., in the form of flats, in varied widths of from one to six inches. Some higher carbon stock also is used and this is supplied by Heller Bros., Newark, N. J. Before rolling the stock goes to the cleaning department, where it is freed of all roll scale or rust by immersion in a dilute sulphuric acid bath. There are two tubs in this department with a capacity for handling 14,000 pounds of steel in 10 hours. The steel coils are affixed to a wooden frame and are dipped into the solution. A ½-ton electric traveling hoist now is being installed to facilitate the handling of the steel between the stock room and the cleaning department.

Annealing is Necessary

After being cleaned, the steel flats are taken to the rolling mill department and passed through the rolls. This operation continues to the point where the steel becomes so hard, its further reduction is impossible. It then is taken to the annealing department, where it is heat-treated in a furnace of special type. This furnace is gas fired from a producer installed by R. D. Wood & Co., Philadelphia. Connected with the producer is a scrubber for cleaning the gas which also was installed by R. D. Wood & Co. A 60-horsepower Bovard & Sefang fire tube boiler furnishes steam for the pickling tubs in the cleaning department and for the gas producer.

The strips, after being finally rolled to the desired specification, are slipped in coils or are cut to length. A shearing machine of the Rheinische - Walz Maschienfabrik type is used to cut the steel to length. This machine is capable of being used as a single shear or as a gang shear for cutting four strips at one operation. The cutting of several strips at one time is made possible by the adjustment of the desired number of saws on the arbors of the machines. As now arranged the maximum number of strips handled at one time is four. The strips finally are run through a straightening machine of the company's own design. The shearing and straightening machines are located in a line with the eight-inch mills and are operated by belt from the motor-driven overhead shaft which runs the mills. A Long & Allstatter No. 4 shear is also installed.

Machine Shop Equipment

A fully equipped machine shop is located at one end of the rolling mill department. For grinding the rolls for which a glass finish is required, a Norton plain grinder is used. Miscellaneous grinding is done on a Morse universal grinder. There is also a Townsend plain emery grinder. The other tools include a Gould & Eberhardt shaper, two Fay & Scott lathes, one Racine power saw, one Rockford drill and a Washburn sensitive drill. Several woodworking machines for making shipping boxes and also for pattern work, including a power rip saw, a power crosscut saw and other tools have been installed. A 40-horsepower Crocker-Wheeler generator is included in the power equipment of the works to furnish direct current for several variable speed motors required in the annealing processes. The water for the operation of the plant is obtained from artesian wells and motor-driven pumps are used to bring it to a storage tank located convenient to the cleaning department and to the boiler room.

Arrangements now are being made by the Schwartz-Hermann Steel Works to shortly add the rolling of razor steel to its operations. The equipment is being assembled now and it is expected that this addition to the plant will be in operation in about six weeks. Later the manufacture of cold-drawn wire is to be undertaken.

Some of the members of the Schwartz-Hermann company formerly were associated with other cold rolling plants of the east. Karl A. Hermann the secretary and general manager, formerly was in the employ of the Crucible Steel Co. of America at the Spaulding Jennings Works, Jersey City. Geo. H. Winters, the works manager, was with the Spaulding Jennings Works and prior to that with R. H. Wolf & Co., New York City. The president of the company is Louis Schwartz, New York City.

Put on Same Basis

Washington, April 13. — The freight rate of 95 cents per 100 pounds on corrugated galvanized sheet iron, gages 11 to 16 inclusive, in carloads, from Middletown, O., to Portland, Ore., and West Berkley and Los Angeles, Cal., has just been held in a decision of the interstate commerce commission not to be unreasonable, but to be unjustly discriminatory to the extent that it exceeds 85 cents contemporaneously in effect between the same points on plain galvanized sheet iron of the same gages. The commission denied reparation sought by the complainants, the California Corrugated Culvert Co., the Security Vault & Metal Works and Coast Culvert & Flume Co., manufacturer of culverts, tanks, flumes and siphons, at the points of destination involved in the proceeding.

Engineers' Club.—The Engineers' Club of Trenton, N. J., has been incorporated for the purpose of advancing engineering knowledge. The headquarters of the organization are in the Trent Theater building and the trustees are: Alfred C. Gregory, Newton A. K. Bugbee, Fred C. Carstarphen, Joseph E. English, John E. Elliott, J. Ridgway Fell, Alfred P. Bellis, Alexander P. Gest, Frank J. Eppele, Frank W. Kennedy, Frank W. Bunn and Abram Swan Jr.

The Ferguson Iron & Steel Co. has begun erecting at Buffalo a proposed plant for the Curtiss Aeroplane Co. The initial unit will be 100 x 300 feet, and when this is completed another unit of equal size will be added, giving the works a capacity of 200 machines monthly. The Curtiss company is negotiating to establish a branch at Penn Yan, N. Y., also in addition to its Buffalo works.

The Chicago Iron & Metal Co. and the Northwestern Paper Mills Supply Co., both of Chicago, have been consolidated and will be operated under the name of the Chicago Iron & Metal Co. at 3000 South Kedzie avenue. The company has a large scrap iron yard well equipped for handling scrap and plans are under way for an addition to accommodate added business.

The Pratt & Whitney Co., of Michigan, on May 1 will vacate its offices in the Majestic building and its store at 52 Larned street, Detroit. New quarters for both the offices and store have been obtained in the Kerr building, Beaubien and Fort streets east, where a complete stock of Pratt & Whitney small tools will be carried.

Money and Iron: Fact and Comment

Bethlehem Steel Common Makes Astonishing Gains

And General Advance Characterizes the Stock Market—High Financial Authority Declares That Manipulators, Frenzied by Success, Seem to Have Lost Their Heads

SHALL fools lead us to fields of prosperity and peace?—is a question which is suggested by the amazing developments of the past week on the New York stock exchange. Of course conditions in the industrial world have changed for the better during the past few months. Fears that were entertained about American securities being dumped on the market and paralyzing business in this country have not been realized, the balance of trade in favor of this country has become very large, the cotton situation is greatly improved, unemployment has almost ceased to be a problem and the demand for many manufactured products is steadily increasing. But all this does not justify such advances in stocks as recently have been witnessed, as, for example, Bethlehem Steel, which on April 1, 1914, sold at 42 and closed Monday of this week at 124.

"The performances now being witnessed on the stock exchange cannot be viewed with unconcern," says the *Financial Chronicle,* of New York. "The element of artificiality in them is altogether too patent to be ignored." After referring to the improvement in conditions in the business world, the *Chronicle* adds, "What is going on at the stock exchange, however, is of a different order. The improvement in the situation is being used as the lever for boosting prices with a dazzling recklessness. If anyone may judge from stock exchange records, manipulation is the governing factor. * * * The movement has now been continued for several successive weeks; and with each succeeding day the manipulators have been getting more bold, until the present week it seemed as if, frenzied by success, they had now completely lost their heads, and become possessed with the idea that there was no limit or bound to which their daring and recklessness might not go without risk of ill-consequences."

These are timely words of warning, but, after all, is it not possible that the reckless manipulators have appeared on the market at just the right time to give the depressed and lethargic business world the stirring up that it needs? If, as seems probable this week, rapid advances are checked, it will not be too much to hope that the movement of stocks may continue upward at a moderate rate and in harmony with the slow, but sure, industrial improvement.

Buys Bethlehem Bonds

Announcement is made that Hallgarten & Co., Harvey Fiske & Sons and Solomon & Co. recently purchased from the Bethlehem Steel Co. $4,300,000 of its first and refunding 30-year 5 per cent bonds. Mr. Schwab announces that the purchase was made upon an old option. The preceeds of these bonds, it is understood, will be applied to the further improvements to the Bethlehem Steel works, which Mr. Schwab recently officially stated were in view. Mr. Schwab has taken the pains to deny a rumor that the control of his company recently has passed to a large British arms and ammunition manufacturing company. This is one of the crop of rumors which have bobbed up in Wall street as a result of the spectacular rise of Bethlehem common stock. Mr. Schwab states there has been no recent change in the control of ownership of his company.

Ellen McDonnell, widow of the late M. McDonnell, and her son, J. M. McDonnell, have filed a petition asking for a receiver for the McDonnell Boiler Iron & Boiler Works, East Des Moines, Ia. Mrs. McDonnell states since the death of her husband the business has been closed for stock inventory, and so long a period has been taken that the business has grown into indebtedness. The husband died without making a will.

Car Company Deficit

Toronto, April 13.—The annual meeting of the National Steel Car Co. of Hamilton, will be held April 24. An advanced statement shows a net deficit on operations for the year ending Nov. 30 of $6,680. The net earnings for the previous fiscal year were $236,052. The surplus amounts to $80,785. The directors state that competition last year was very keen, orders in some cases being taken below cost to keep the organization together. The company has now orders to the amount of over $3,000,000 on its books and expects the contracts received from the British and French governments to be fairly profitable on account of the present exceptionally low price of raw material.

An Exciting Week

Last week was one of the most remarkable in the history of the New York stock exchange. The heavy buying started early Monday morning and the first two hours piled up an immense volume. Bethlehem Steel advanced more than 4 points, to 92, receded and finished at 92½. General Motors and American Locomotive were prominent in the advances. Tuesday, Bethlehem Steel declined about 4 points, as evidently there was some disappointment in the failure of the annual meeting to develop anything except a statement by Mr. Schwab that earnings would continue to be placed in improvements. Trade in Goodrich common exceeded $1,700,000 during the day. Wednesday, Willys Overland and General Motors advanced, but Bethlehem Steel indicated the effect of continued selling. Thursday Bethlehem Steel resumed its advance and went up 29½ points, selling at 117. Later it slumped 15 points, but before the close of the day, registered 105. Friday the number of sales was larger on the exchange than

on any day since July, 1914, the total being 1,368,300 shares, and nearly everything advanced. Steel rose 7⅜, closing at 57, and Bethlehem advanced 7. In the two hours of Saturday, the sales footed up 848,800 shares and great excitement prevailed. Steel common rose to 58, fell back to 55½ and closed at 56. Bethlehem Steel was not so prominent, but closed with a net gain of 22⅜ for the week on common and 5⅜ on preferred. Gains made during the week by companies closely connected with the manufacture of iron and steel were as follows:

American Brake Shoe & Fdy. Co....	+ 1
Amer. Brake Shoe & Fdy. Co., prfd.	.....
American Can	+ 4¼
American Can, prfd.....	+ 3
American Car & Foundry Co.....	+1 ½
Amer. Car & Fdy. Co., prfd.....	— ½
American Locomotive	+ 2¼
American Steel Foundries.....	+ 5½
Baldwin Locomotive	+ 3¾
Baldwin Locomotive, prfd.....	+ 4
Bethlehem Steel	+22⅜
Bethlehem Steel, prfd.....	+ 5⅜
Colorado Fuel & Iron.....	+ 4½
Continental Can	— 1⅜
Continental Can, prfd.....	— ½
General Electric	+ 4½
International Harvester of N. J.....	+ 5½
International Harvester of N. J., prfd.	+ 2
Inter. Harv. Corp.....	+15¼
Nat'l Enameling & Stamping Co.....	+ 2
Pressed Steel Car.....	+ 1¼
Pressed Steel Car, prfd.....	+ 3⅜
Pullman Palace Car.....	+ 2¾
Republic Iron & Steel Co.....	+ 4¼
Republic Iron & Steel Co., prfd.....	+ 5⅜
U. S. Cast Iron Pipe & Fdy.....	+ 2⅜
U. S. Cast Iron Pipe & Fdy., prfd....	+ 8
United States Steel.....	+ 6⅞
United States Steel, prfd.....	+ 3⅛
Westinghouse Mfg.	+ 3⅜

Will Co-operate

President Marble, of the Merchants' Association of New York City, has appointed a committee to make suggestions to the new federal trade commission as to the administration of the law it was appointed to enforce. The committee consists of the following members:

Henry R. Towne, chairman, president of the Yale & Towne Mfg. Co.; Gilbert H. Montague; W. H. Childs, president of the American Coal Products Co.; W. M. Gladding, vice president of Borden's Condensed Milk Co.; and Waldo H. Marshall, president of the American Locomotive Co.

Each of the members named has given especial attention to the Clayton act.

Files Suit

The state attorney general has filed suit in district court at Austin, Tex., against the National Tube Co., of Pittsburgh, charging it has violated Texas' anti-trust laws. Injunction is asked to restrain the defendant "from hereafter furnishing resale prices on welded goods to certain Texas corporations." No amount is named in the suit for penalties, but under Texas law on conviction the minimum is $50 per day and the maximum $500 a day while the conspiracy exists.

Obituaries

Daniel Renoir Russell, president of the D. R. Russell Engineering & Development Co., St. Louis, died in the Biltmore hotel, New York City, April 9, aged 52. His company has built many gas plants throughout the country.

Archibald Duncan, 47 years old, superintendent of the lap weld department of the National Tube Co.'s plant at McKeesport, Pa., died last week from pneumonia. He was a city commissioner of McKeesport, and had taken an active interest in the civic development of the city.

John Cowan, president of the Ontario Malleable Iron Co., of Oshawa, Ont., and one of the foremost citizens of that town, died on April 8 at an advanced age. In 1866 he took charge of the Cedardale Works, Oshawa, and in 1872 organized the Ontario Malleable Iron Co., of which he became president, a position which he held for 43 years.

George Cutter, aged 59 years, formerly president of the George Cutter Co., South Bend, Ind., and for some years engaged in electrical manufacturing in Chicago, died April 7 in Los Angeles, Cal., on his return from the Panama-Pacific exposition. Since retiring from business two years ago he had made his home in Washington, D. C.

William Disston, president of the Henry Disston & Sons Co., Philadelphia, who died at Philadelphia, April 4, as stated briefly in *The Iron Trade Review* of April 8, had been the head of the Disston company, which is the largest manufacturer of saws in the world, since 1896. In that year he succeeded the late Hamilton Disston to this office. Mr. Disston was 56 years of age and was the son of Henry Disston, founder of the Disston works. He became ill last January and went to Florida to recuperate. He experienced a sudden attack in the south and was hurried by special train to a Philadelphia hospital for treatment. After continuing in a critical condition for several weeks, he recovered sufficiently to return to his home and appeared to be out of danger. A sudden attack brought on his death. Mr. Disston was prominent in the business affairs of Philadelphia and was a member of various commercial and social organizations.

F. Hopkinson Smith, well-known author, artist and engineer, died at his home in New York City, April 7, aged 77 years. His life was characterized by notable accomplishments in such diversified lines as to make him as a many-sided genius. In his early business years, he was connected with his brother's iron foundry, but the business was discontinued after the civil war. At the age of 25 years, he then became associated with an iron business in Broad street, New York City. While thus engaged, he determined to become a mechanical engineer and succeeded so well that he became the constructor of a number of important public works, notable among which was the foundation for the statue of Liberty, in New York harbor, and various lighthouse and breakwater work. Mr. Smith had been a painter from his boyhood days but he did not begin writing for publication until after 45 years of age. In a comparatively few years, his books acquired for him a high position as an author. Mr. Smith was a member of the American Society of Civil Engineers and of various art, literary and social organizations.

Thomas William Fitch died at his home in Brooklyn, N. Y., April 8, aged 70, after a long illness. He had been a lieutenant in the United States navy, but retired to engage in the wire business at St. Louis many years ago. About 35 years ago, he went to Pittsburgh, where he soon became a prominent organizer, founder and director in the steel industry. He was one of the founders and general manager of the Consolidated Steel & Wire Co., which later became part of the American Steel & Wire Co. With Thomas Walker, of Pittsburgh, he organized the Pittsburgh Wire Co., which also became a part of the American Steel & Wire Co. James A. Farrell, president of the United States Steel Corporation, was sales manager of the Pittsburgh Wire Co., serving under Mr. Fitch and his associates. Mr. Fitch helped organize the Pittsburgh Steel Shafting Co., which was purchased by the Columbia Bridge Co., now known as the Columbia Steel & Shafting Co. He was president of the Columbia company until a few years ago, when he was succeeded by his son, Thomas W. Fitch Jr. He was instrumental in the formation of the Griswold Wire Co., of Braddock, Pa., and of the Braddock Machine Co., that city.

German Steel Production

The total German production of steel in 1914 amounted to 14,673,644 tons, as compared with 18,579,643 tons in 1913 and 16,955,958 tons in 1912.

In 1914 the production of pig iron reached a volume of 14,062,055 tons, as compared with 18,922,988 tons in 1913.

The steadily increased output from month to month is shown as follows: September, 644,968 tons; October, 882,197; November, 882,025; December, 922,571.

Gompers is Cautious

Washington, April 13.—Movements under way through different organizations and individuals to end the European war may be participated in by organized labor in this country, but Samuel Gompers, president of the American Federation of Labor, said he would not discuss the possibility of organized American labor bringing pressure to bear to end the war.

"I don't know what organized American labor could do," said Mr. Gompers. "Its capabilities have never been fully tested, and I hope the day will never come when they will have to be".

Mr. Gompers expressed the opinion that it will be of little use for laboring men of England, or any other country now engaged in war, to "demand peace at the earliest possible moment", unless they couple with their demands a provision for disarmament or some other method of obtaining at the end of the war something different from the condition prevailing before hostilities broke out.

"I am so shocked at the horrible brutalities that have been perpetrated abroad," Mr. Gompers said, "that I, for one, would want to be very sure that any immediate peace such as the cable dispatches say laboring men of England are asking would bring with it some guarantee that there would not be a restoration to the position of armed preparedness of nations which might soon result in another war."

Mr. Gompers denied that he is to attend a conference in New York by labor leaders to discuss the possibility of American labor urging the end of the war upon humane grounds. He said he had been invited to deliver an address in New York this week at a meeting under labor auspices to discuss the possibility of ending the war.

Making Extensions

Plant extensions to meet the demand for war material are being made with remarkable rapidity in England. At the annual meeting of Hadfield's, Ltd., the chairman, showed the first 4.5-inch howitzer projectile turned out from the new plant which his firm had erected on land which in the middle of November was a bare field. This plant has been equipped with 300 or 400 lathes. Another plant, of equal or greater magnitude, is now being installed. Sir Robert Hadfield expressed regret that the firm's capacity for producing artillery munitions had not been taken full advantage of in the past. He said that after the Boer war their orders for shrapnel, for which they had a splendid plant, came to an end, nor could they secure any more, although they twice made representations to the war office, finally giving notice that, unless they received orders by a certain date, the plant would have to be disbanded and used for other purposes. It was disbanded, and the use of a plant capable of producing immense numbers of shrapnel or other shells was entirely lost to the nation.

Saving in Casualty Expense

C. L. Close, manager of the United States Steel Corporation's Bureau of Safety, Sanitation and Welfare, in an address before the National Civic Federation at New York City, on April 7, stated that the gross savings to the Corporation in casualty expense during the past three years has been $4,775,692. After deducting the expenditures for carrying on this work, a net saving of $2,771,980 is shown. Between the years 1906 and 1913, a decrease of 38.29 per cent in accidents was realized. Total expenditures to safeguard against accident, which has been taken by the Steel Corporation, has been $5,500,000. In 1913, 7,399 men had served upon the various committees.

Making Big Shells

Toronto, April 13.—The Nova Scotia Steel & Coal Co. has presented Hon. Sam Hughes, Canadian minister of militia, the first 18-pound shell ever finished in any Canadian engineering shop. It is made from Nova Scotia open hearth steel, the preparation of which for shell manufacture was only effected after a series of experiments by Col. Cantley, of the Nova Scotia company. Nova Scotia steel had been previously regarded as unsuitable for shell manufacture. Everything required in the shell except the copper band was produced in Canada.

Ask Lower Rate

Nashville, Tenn., stove manufacturers have filed a complaint with the interstate commerce commission through the Nashville traffic bureau, alleging that excessive rates on pig iron from the Birmingham district are being charged. The complainants are the Allen Mfg. Co., the Gray & Dudley Hardware Co., Jones & Hopkins Mfg. Co., and the Phillips & Buttorff Mfg. Co. A reduction of 33 cents per ton is sought, to conform with a similar reduction which it is alleged was recently made in the rates to Louisville. The Louisville & Nashville and other southern carriers are the defendants. The present rate is $2 a ton.

Needed for Steel Hardening

The Ontario department of mines has received inquiries from the Imperial Institute of London with regard to the production of molybdenite in Ontario. This metal is at present much in demand in Britain for steel-hardening in the manufacture of armaments. The names of producers and samples of the deposits are asked for. Molybdenite exists in quantities in northern and eastern Ontario but as yet there has been no commercial production of this metal, which it is now hoped may be stimulated by the market now opened. Tungsten is also required in England for steel hardening to replace the supplies formerly obtained from Germany, and the provincial mines department is making an investigation to ascertain whether the industry can be developed in Ontario.

Moldenke's Address

Doctor Richard Moldenke addressed the New England Foundrymen's Association at the Exchange Club, Milk and Battery March streets, Boston, at five o'clock on Wednesday evening, April 14, upon the subject: "Looking Backward in the Foundry." Doctor Moldenke at present is engaged in the writing of a book and has made some investigations along the lines indicated by his subject, which were discussed at the meeting. The usual monthly dinner of the association was served at six o'clock. At the meeting of the association on Wednesday, May 12, Wm. A. Viall, of the Brown & Sharpe Mfg. Co., Providence, R. I., will talk informally on "The Shipping and Transportation Question of Today".

Wheel Inquiry

The Buffalo Chamber of Commerce reports: "We have an inquiry from Norway for wheels for locomotives and railway cars to replace German ready made wheels with axles suitable for Norwegian locomotives."

The Warren City Tank & Boiler Co., Warren, O., advises it has placed a contract with McClintic-Marshall Co., Pittsburgh, for a modern plant to manufacture steel tanks of all sizes, to be erected in Warren. The proposed plant will be of all-steel and concrete construction, approximately 180 x 850 feet. It will be completed in about five months. About 1,500 tons of steel will be used in the construction. The erection of the proposed plant will not interrupt operations of the old plant.

A Real Railroad List Once More

Burlington Railroad Makes Big Inquiry—Pittsburgh Sellers More Firmly Convinced Domestic Buying Movement is Near—Export Demand Slackens

CONSIDERABLE war business is pending in the machinery market but still there is a lack of spectacular transactions such as have featured the situation recently. The American Car & Foundry Co. is inquiring for large quantities of shrapnel-making equipment, which it is believed will be installed at one of that company's western plants. The General Electric Co., which is making shrapnel at both its Lynn and Schenectady plants, it develops, recently bought a considerable quantity of special equipment; this company now is inquiring for 42 lathes. The General Electric Co. also recently has closed on several small lots of machine tools, which, however, have nothing to do with its shrapnel requirements. G. M. Haardt of the Mors Automobile Co., Paris, who last week was mentioned as a buyer of large quantities of shrapnel-making equipment for export, has placed some further business. The machinery so far ordered by Mr. Haardt involves an outlay of several hundred thousand dollars. Inquiries on machine tools for export continue to be received but the export demand is considerably smaller in volume than several weeks ago. Domestic demand, which has nothing to do with the war, appears to reflect some improvement; at least, a number of inquiries are pending each of which involve several good-sized tools. The Locomobile Co. of America, Bridgeport, Conn., is buying a large amount of new equipment. The Royal Equipment Co., Bridgeport, Conn., is understood to be inquiring for some tool equipment. The Utah Copper Co., 165 Broadway, New York, is asking for bids on a few machines. The railroad demand shows practically no improvement. The Lehigh Valley railroad is in the market for a car wheel borer and the Pennsylvania railroad is in the market for two large electric cranes. A feature of interest in connection with the market for railroad machine tools, is the heavy damage caused by fire last week at the Portsmouth, Va., shops of the Seaboard Air line. The total loss is estimated at about $250,000 and the heaviest loss occurred in the machine shop. The Brooklyn navy yard, which opened bids on a number of machine tools on April 13, is taking bids on further machinery until April 20. The Pennsylvania railroad is in the market for two 100-ton electric cranes. The Delaware, Lackawanna & Western railroad has ordered a 25-ton gantry crane from the Toledo Bridge & Crane Co. The United States Cast Iron Pipe & Foundry Co. bought four Morgan radial cranes for its Bessemer, Ala., plant. Last week it was erroneously stated in *The Iron Trade Review* that the M. W. Kellogg Co., Jersey City, N. J., bought a 15-ton Maris crane. The report should have stated that the Kellogg company bought a five-ton Niles crane, while Westinghouse, Church, Kerr Co., New York, bought a 15-ton Maris crane for installation at the Winchester Repeating Arms Co.'s plant, New Haven, Conn. Barney & Smith Car Co., Dayton, O., has obtained a shrapnel contract from the Canadian Car & Foundry Co.

Burlington Issues a Big List

A quickening in the demand for machine tools, experienced by Chicago dealers 10 days ago, has continued and increased. At present inquiry is larger than at any time during the past two years and is not confined to orders leading back to the European war. Eastern sellers appear to have depleted their stocks to a point making necessary shipments of machines from western stores and not a few shipments of this kind are being made at present. From Iowa and other western states a strong demand is coming for practically every sort of tool used in machine shops, purchases varying from single machines to small groups of three to six tools. The demand for lathes and screw machines to be used in turning shrapnel cases continues strong.

The most important recent development is an inquiry from the Chicago, Burlington & Quincy railroad for the largest list of tools which has come from any western railroad in many months. This asks for the following equipment: Three wheel presses, one of 600 and two of 400 tons; a forging machine; a double ended punch and shear; a 5-foot radial drill; six 36-inch shapers; one 18-inch slotter; three 30-inch lathes; a 28-inch, a 24-inch and two 20-inch engine lathes; four tool room lathes; three 3 x 36-inch turret lathes; two 42-inch Bullard mills; one 84-inch driving wheel lathe; a 54-inch car wheel boring lathe; two universal tool grinders; one metal band saw; six car wheel journal boring machines; three pipe machines; three triple headed bolt cutters; a complete band saw mill with capacity up to 50 feet long and 30 inches diameter; a 36-inch extra feed rip saw; a 42-inch band saw; an electro-plating outfit; and two 240-horsepower water tube boilers for 150 pounds pressure.

Expect Buying Movement

With steel mills and foundries gradually increasing operations, machine tool sellers in the Pittsburgh district are more firmly convinced the long-expected buying movement will soon be in full swing. An unconfirmed report is heard that railroad shop superintendents of one of the more important lines are preparing tentative lists, preparatory to making requests for appropriations, and steel plant managers seem more

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PHILADELPHIA, PA., 319 Perry Bldg.

Say you saw it in THE IRON TRADE REVIEW

willing to make replacements and to increase facilities. The Youngstown Iron & Steel Co., Youngstown, continues to buy equipment for its new plant, but the program is nearly completed. This company has awarded contracts for five cranes, equipped with General Electric motors, to the Morgan Engineering Co., Alliance, O.; the cranes have capacities ranging from 25 tons to 60 tons. The Babcock & Wilcox Co. will furnish the boiler equipment. The Youngstown Sheet & Tube Co. will award contracts shortly for a by-product coke oven plant, to consist of about 200 ovens, and the Republic Iron & Steel Co., also of Youngstown, soon will let contracts for power house equipment, to cost about $300,000. N. L. Rundio, founder, Williamsport, Pa., will soon ask for bids on three molding machines.

War Contracts Help Dayton Shops

In Cincinnati, more orders for machine tools are being received from domestic sources, but they have indirectly been brought about by the European war. Several firms in Ohio have recently received large orders from Europe for shrapnel cases, either as direct contracts or sub-contracts, and are adding to their facilities. Demand for 14, 16, 18, and 20-inch lathes from Europe shows no let up and Cincinnati lathe manufacturers are using every available inch of space and are working day and night in all departments.

Machine tool makers are naming practically their own terms, but European nations seem anxious to place orders regardless of any obstacle, if they can only get shipments at a reasonable date. The Barney & Smith Car Co., Dayton, O., has recently received a $1,000,000 order for forgings as a sub-contract from the Canadian Car & Foundry Co., and has in turn let sub-contracts for machine work on the forgings to Dayton firms, such as the Platt Iron Works, the Davis Sewing Machine Co. and the Dayton Mfg. Co. The forgings will be used to make shrapnel for the Russian government.

EASTERN STATES

DOVER, N. H.—Frank Wentworth is planning the erection of an automobile factory on the Peaslee property.

ENOSBURG, VT.—J. J. Whitney, Richford, Vt., is in consultation with L. L. March with a view to building an elevator near the railroad, the present plan is to build a power plant on the site of the recently burned mill.

BOSTON.—Plant of A. S. Campbell Co., machinist and dealer in electrical specialties, 309 North street, was damaged by fire.

TAUNTON, MASS.—Weir Stove Co. has let the contract to L. M. Wetherell & Sons Co., Court street, for a 1-story, 65 x 150-foot foundry. F. W. Dean, 53 State street, Boston, is the architect.

BRIDGEPORT, CONN.—Flynt Building & Construction Co., Palmer, Mass., has the contract for a 1-story, 50 x 150-foot assembling building, to be erected for the Locomobile Co. of America at Bridgeport.

NEW HAVEN, CONN.—Kolynos Co. is taking bids on a 4-story, 80 x 120-foot addition.

THOMASTON, CONN. — Seth Thomas Clock Co. has broken ground for what will be eventually an entire new plant; plans call for a main building, 60 x 340 feet, four stories, and from it at either end will extend two wings, 60 x 200 feet; between wings another building, one story, 120 x 220 feet will be erected and in the rear of the left wing a power plant; in front of the main building is to be 50 x 50-foot, 4-story office building; entire construction will be reinforced concrete.

PROVIDENCE, R. I.—Wm. G. Richards, 17 Exchange street, is drawing plans for a 3-story, 40 x 60-foot light manufacturing building to be erected at the foot of Printery street, by Jacob Berger, 13½ Douglas street.

BROOKLYN.—Wm. Kennedy Construction Co. has the contract for a $49,000 addition to be built at the smelting plant of the National Lead Co.

BROOKLYN.—Architect Wm. H. Ludwig, 801 Eastern Parkway, is taking bids on a 2-story, 80 x 100-foot factory to be built on Forty-fourth street near Third avenue for Frank A. Aliano, 5418 Sixth avenue.

BUFFALO.—Turner Construction Co. has the contract for a 4-story and basement, 80 x 200-foot building, to be erected on Main street, near the Erie railroad tracks, for the Buffalo Meter Co. The building will cost approximately $125,000.

BUFFALO.—Iroquois Construction Co. has been incorporated; $10,000 capital stock; by Walter C. Barker, Henry V. Hucker and Harry McGail, 1181 Ellicott square, Buffalo.

LE ROY, N. Y.—Le Roy Salt Co. will build a three-story, 75 x 80-foot addition to its salt refinery.

LOCKPORT, N. Y.—Harrison Mfg. Co., maker of auto radiators, has let contract to Manion Bros., Rochester, for a $15,000 addition to be built at Lockport.

LONG ISLAND CITY, N. Y.—Auto Specialty & Equipment Co., 596 Jackson street, is taking bids on a 5-story, 50 x 96-foot, factory building. John M. Baker, 9 Jackson avenue, is the architect.

NEW YORK.—Lehigh Valley railroad is in the market for a carwheel borer.

NEW YORK.—Utah Copper Co., 165 Broadway, is asking for bids on several machine tools.

NEW YORK.—Turner Construction Co. has the contract for 9-story and basement factory to be erected on Willow street, Hoboken, N. J., for the American Lead Pencil Co.

NEW YORK.—Cornfield Resilient Wheel Co. has been incorporated; $4,000 capital stock; by Stanislac Verusio, William H. Byrne, Noah Cornfield, Hotel Apthorp.

NEW YORK.—Tottenville Copper Co., 603 West Twenty-ninth, has let contract to McClintic-Marshall Co. for construction of 124 x 204-foot smelting plant at Tottenville, S. I., N. Y.

NEW YORK.—Parco Mfg. Co., razors, blades and hardware specialties, has been incorporated; $25,000 capital stock; by J. Sexton, M. E. Jacobus, G. W. Park 1025 Forty-seventh street.

NEW YORK.—Babylon Power Corporation, transportation, electricity for light, heat and power, has received its charter; $1,000 capital stock; John V. Flood, Edgar Hirschberg and Daniel E. Hanlon, 2646 Morris avenue, incorporators.

NORTH TONAWANDA, N. Y.—Stoney Foundry Corporation will apply for a charter shortly. E. C. Andrews, Buffalo, president; John Stoney, Cleveland, vice president; Albert M. Everhart, North Tonawanda, secretary-treasurer.

SCHENECTADY, N. Y.—General Electric Co. is inquiring for 42 lathes.

SYRACUSE, N. Y.—Syracuse Heater Co. has increased its capital from $50,000 to $75,000.

TRENTON, N. Y. — City commissioners have appropriated $260,000 for the erection of the proposed junior high school; the building will cover two acres.

BRYN MAWR, PA.—A 2-story carriage factory and automobile repair shop of C. W. Scott Co., damaged by fire.

COATESVILLE, PA.—Council will proceed at once to sell $185,000 bonds and build a waterworks on Rock Run.

HARRISBURG, PA. — Architect T. H. Hamilton, Patriot building, is drawing plans for a 3-story factory building. The owner's name is withheld.

HOMESTEAD, PA.—Tobias Heater Co. has been incorporated; $20,000 capital stock; by J. M. Tobias, James Ward Jr., H. P. Wiggins, Pittsburgh; George H. Wilson, J. Clyde Miller, M. W. Coulter, Homestead; William Menk, Munhall.

PHILADELPHIA. — Pennsylvania railroad is in the market for two large electric traveling cranes.

PHILADELPHIA.—Architect Peter Kuhn is taking bids on a 2-story and basement, 75 x 121-foot addition for Fretz, Gross & Co., Twenty-second and Sedgeley avenue.

PHILADELPHIA.—Watson & Huckel are preparing plans for a 3-story addition, 48 x 108 feet, to the plant of the Hess-Bright Mfg. Co. at Front street and Erie avenue.

PHILADELPHIA.—Harrison Bros. & Co., Inc., Thirty-fifth and Gray's Ferry road, have let contract for a 1-story, 50 x 60-foot power plant, to H. E. Barton, Twelfth and Sanson streets.

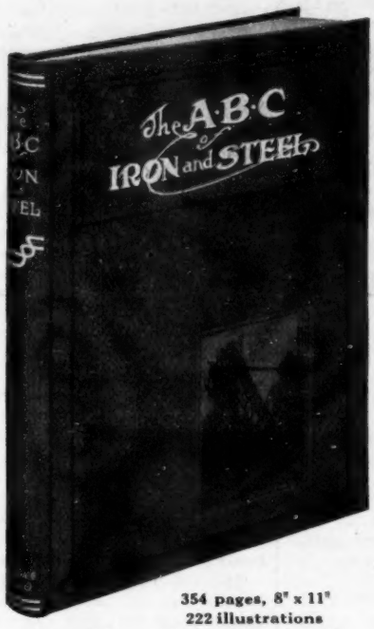
PHILADELPHIA. — Frederick J. Ritter, Seventh and Dauphin streets, is taking bids on a 4-story and basement, 80 x 90-foot addition, to be erected at Hutchinson and Oxford streets by the Ritter Mfg. Co.

PITTSBURGH. — Farris Engineering Co. has been incorporated; $30,000 capital stock; by John Farris, A. W. Nance and M. G. Eichenlaub.

PITTSBURGH.—Standard Electric & Mfg. Co. has been incorporated; $10,000 capital stock; by Benjamin Raphael, Max I. Amdursky, Joseph Goldstein.

PITTSBURGH.—Zenith Stove & Heater Co. has been incorporated; $18,000 capital stock; by John C. Bash, J. S. A. Smith, Pittsburgh; William Walker, Shields, Pa.

PITTSBURGH. — Board of education will ask new bids on the Schenley high school



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Directory of Iron and Steel Works of United States and Canada, showing products made by each, and giving names of officials.
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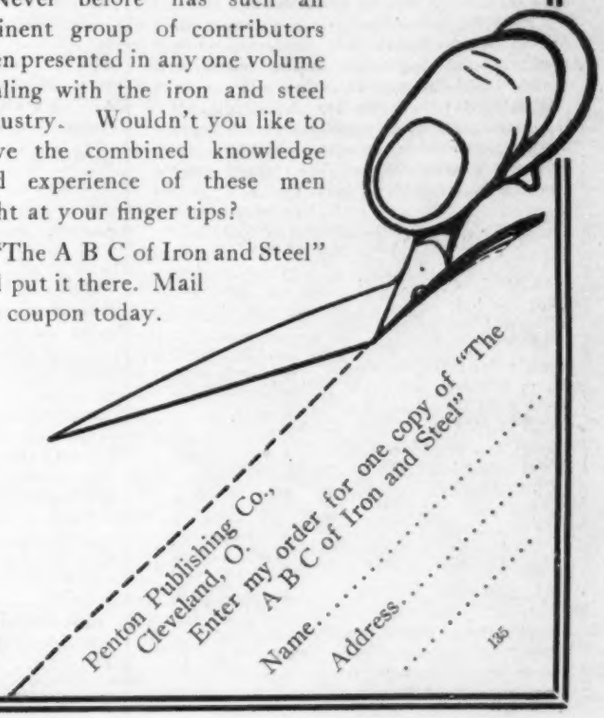

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building, the present contract for which has been declared void at law; the building will be 460 x 306 feet, and will involve 1,600 tons of steel.

PUNXSUTAWNEY, PA. — A city water works system, to cost $150,000, will be voted upon at an election shortly; R. G. Ressler, city engineer, is working on plans.

READING, PA.—L. H. Focht & Son, Philadelphia, have secured a permit for building a brick and concrete addition at the plant of the Carpenter Steel Co.

SCRANTON, PA.—Albert J. Ward, architect, has completed plans for a 2-story, 60 x 300-foot plant for the Motor Kart Co. The letting of contracts, however, is held in abeyance.

SHARON, PA.—State waterways commission has approved the plan of erecting a steel trussed type of bridge with one pier over the Shenango river.

SHARON, PA.—A committee from Sharpsville, Pa., will confer with the county commissioners at Mercer on the project of building a viaduct over Pine Hollow, near Sharpsville.

CAMDEN, N. J. — Plant of the Collings Carriage & Auto Body Co., Front and Arch street, was badly damaged by fire.

HOBOKEN, N. J.—American Lead Pencil Co. will build a 6-story, 40 x 70-foot addition, which later will be increased to 10 stories. Architect Franklin M. Small, 265 Broadway, New York, has plans in progress.

NEW BRUNSWICK, N. J.—Utility Construction Co. has been incorporated; $100,000 capital stock; by Fritz C. Schneider, Harry J. March, Clarkson Steele, Alfred S. March.

ROCKAWAY, N. J. — International High Speed Steel Co., which is completing a new plant here, shortly will begin the erection of another new building for which plans now are being drawn.

TRENTON, N. J. — Agasote Millboard Co. is preparing plans to enlarge its plant at Agasote, near here. John G. Brown, Trenton, is completing plans for a 92 x 100 and a 100 x 336-foot addition, on which sub-bids shortly will be taken.

WASHINGTON. — Supervising architect, treasury department, will receive bids until April 23 for refrigerating machinery.

WASHINGTON.—The General Purchasing Agent, Panama canal, will receive bids till April 26 for regulating valves, machines, motors, limit switches, etc.

WASHINGTON.—The bureau of supplies and accounts, Navy department, will open bids on April 20 for several small lathes, an 800-pound steam hammer and other equipment for the Brooklyn Navy Yard.

CENTRAL STATES

AKRON, O. — Safety Director Sten has asked for bids on an $8,500 machine shop to be erected on Buchtel street.

CANTON, O.—Victor Specialty Co., which recently increased its capital stock from $50,000 to $100,000, will erect an additional building for the manufacture of metal toys.

CINCINNATI.—Albert Reinhardt, clerk of county commissioners, will open bids April 23 for rebuilding two bridges in Sycamore.

CLEVELAND. — American Ship Building Co. has given Crowell, Lundoff & Little, 1951 East Fifty-seventh street, the general contract for erecting three buildings, to cost $160,000 in all.

CLEVELAND. — Cleveland Machinery & Supply Co. has been incorporated; $10,000 capital stock; Stanley W. Sparks, William Edward McNaughton, John O'Brien, John L. and E. F. Dowling.

DELPHOS, O.—Delphos Metal Stamping Co. has been incorporated to manufacture sheet metal fence posts, etc., $30,000 capital stock; by O. G. Hackedorn, F. X. Altenberger, Paul J. Snyder, F. A. Gladen and Charles A. Lang.

FOSTORIA, O. — Bickwith Railway Fog Signal Co., railway fog signals, has been incorporated; $100,000 capital stock; by Charles C. German, Henry J. Adams, Clarence E. Franklin and Jesse Stephens.

FREMONT, O.—Bonds in the sum of $20,000 have been sold for the erection of steel Tindal bridge across the Sandusky river, south of Fremont; commissioners will advertise this bridge April 30; County Surveyor Schopflin has completed plans which are now open to inspection.

HAMILTON, O.—Commissioners have ordered plans prepared for a bridge over Indian Creek in Riley township.

NAPOLEON, O.—City engineer will prepare plans for a single unit light system of street lights and posts in the business section.

NEWARK, O.—A $30,000 bond issue for the reconstruction of the municipal light plant and water works failed to carry by 81 of the required two-thirds vote at a recent election.

WARREN, O.—Arthur Vulcanizing Machine Co. has been incorporated; $15,000 capital stock; by James W. Arthur, John M. Arthur, Charles Fillius, J. G. Gates, Paul Masters.

WARREN, O.—W. R. Harrington, county auditor, will open bids April 26 for the erection of the superstructure of the Johnston bridge, South Center road; certified check $100 required.

YOUNGSTOWN, O. — Mahoning Construction Co. has increased its capital stock from $10,000 to $40,000.

YOUNGSTOWN, O.—G. W. McKelvey Co. will erect a $350,000, 10-story, fireproof building on West Federal street; C. F. Owsley, Mahoning Bank building, is working on preliminary plans.

ZANESVILLE, O.—County commissioners will replace the present wooden bridge at Meadow Farm with a 60-foot, steel structure; the commissioners have decided also to erect a stationary bridge across the canal at Taylorsville instead of a swing span.

PARKERSBURG, W. VA.—Engineers of the Parkersburg, Marietta & Interurban railway are seeking a site for the proposed power plant of the company; plans call for a plant to generate more power than the plants at Marietta and Parkersburg combined.

CALVERT CITY, KY.—A flour mill is to be equipped at once by the Calvert City Milling Co., organized with $3,500 capital stock by W. H. Bourland and others.

COLUMBIA, KY.—Columbia Lighting Co. will be in the market for a 50-horsepower oil engine and 30-kilowatt generator within the next six months. A. H. Ballard is in charge.

DANVILLE, KY.—The Commercial club has information relative to the establishment of an underwear mill. The proposed capitalization of the plant is $80,000.

DAWSON SPRINGS, KY.—Dawson Light & Power Co. is building an addition to its power plant and putting in a 100-kilowatt generator, direct-connected to a 150-horsepower shinner engine.

ELIZABETHTOWN, KY.—Greenup Electric Co., which has been incorporated with $10,000 capital stock, plans to install electric light plants at Conora and West Point, Ky. It is operating three other small-town plants.

LOUISVILLE, KY.—American Creosoting Co. is in the market for a limited amount of structural steel for a new plant at Russell, Ky. The other equipment has been bought. Address purchasing agent.

SOMERSET, KY. — Fred Hunt's Machine Shop will buy an 8 x 10 steam engine, a gasoline engine connected with pump, and a number of woodworking machines, including planer, matcher and molder.

WHITESBURG, KY.—A franchise for an electric light system has been awarded to the Starkey Electric Co., Somerset, Ky. It is purchasing equipment to develop 100 horsepower, at an estimated cost of $6,000.

ANDERSON, IND.—Anderson Button-Attaching Machine Co. has been incorporated to manufacture patented machines; $50,000 capital stock; by Joseph F. Fadely, Albert E. Tolin, Earl Berkebile and others.

ANDERSON, IND.—Fire badly damaged the plant of the Plost Post Co., manufacturer of steel fence posts. The plant consisted of two buildings, one 40 x 140 feet and one 50 x 80 feet. The greater part of the loss was on machinery.

BLOOMINGTON, IND.—A $50,000 factory addition will be erected and equipped by the Nurre Mirror Plate Mfg. Co.; J. N. Nurre is president.

BLOOMINGTON, IND.—Plans for a battery of five dry-kilns, operated by steam, have been announced by W. E. Shower, vice president of the Shower Bros. Co., furniture manufacturer.

EVANSVILLE, IND.—The general contract has been let to the Geo. A. Fuller Co., New York City, for a 10-story, steel construction building for the Citizens National Bank.

EVANSVILLE, IND.—Penn Bosse, mayor, is chairman of the coliseum building committee which is taking plans for a coliseum building of fireproof construction, costing $100,000.

INDIANAPOLIS.—Champion Trap & Target Co. has been incorporated to manufacture target throwing machines; $25,000 capital stock; by C. A. Young, W. H. Chamberlain and Henry Veitmeyer.

FORTLAND, IND.—City council has appropriated $70,000 for a county court house; total estimated cost is $250,000.

SOUTH BEND, IND.—Interstate Equipment Co., machinery, has been incorporated; $10,000 capital stock; by Adam, Charles, A. and Grace M. Hunsberger.

SOUTH BEND, IND.—Farmers Security Co. has let the general contract to the Bedford Stone Construction Co., Indianapolis, for an office building, 87 x 167 feet, six stories, of steel construction.

CHAMPAIGN, ILL. — Seymour & White Heat, Light & Power Co. has been incorporated; $2,500 capital stock; by William Murry, Nevada E. and Orlando S. Murry.

CHERRY VALLEY, ILL.—Cherry Valley Light & Power Co. has been incorporated to do a general light and power business; $15,000 capital stock; by Louis Koth, John Faissler and Wm. Fulton.

CHICAGO.—American Car & Foundry Co. is inquiring in this market for equipment for making shrapnel.

CHICAGO.—Holabird & Roche, architects, 104 South Michigan avenue, are preparing plans for a $200,000, 4-story armory for the First Cavalry.

CHICAGO.—Adjustable Lamp Mfg. Co. has been incorporated to manufacture fixtures and novelties; $25,000 capital stock; by Martin J. Isaac, Frank Bagley and Arthur Sherrard.

CHICAGO.—J. E. O. Pridmore, 38 South Dearborn street, is preparing plans for a $200,000, 8-story hotel, of steel construction, for Theodore De Lang.

CHICAGO.—S. N. Crowen, 30 North La Salle street, is drawing plans for a $150,000 hotel for H. Erskine Campbell, 100 x 143 feet, five stories.

CHICAGO.—Milometer Co. has received its certificate of incorporation to manufacture motor driven vehicles; $100,000 capital stock; by O. E. Joseph, A. K. Joseph and James Callahan.

CHICAGO.—Moores and Dunford, engineers, 10 South La Salle street, have let the

general contract to Peter Olson, 19 South La Salle street, for a storage warehouse, 50 x 100 feet, five stories, to cost $40,000.

CHICAGO.—C. A. Eckstorm, 5 North La Salle street, is taking bids for the Knight Light Co., 720 North Franklin street, on a factory and power plant 100 x 130 feet, six stories.

CHICAGO.—Mechanical Products Co. has been incorporated to manufacture castings, implements, tools and machinery; $2,500 capital stock; by Bruno Pascale, E. R. Hartigan and C. W. Palzer, 112 West Adams street.

CHICAGO.—The Tool & Appliance Co. has been incorporated to manufacture machinery; $2,500 capital stock; by H. F. Clark, Arthur A. Abrams and John Bolger, 501 South Clinton street.

CHICAGO. — Anderson Ratchet Co. has received a charter to manufacture tools and wrenches; $5,000 capital stock; Anton T. Anderson, Wm. Daniel and Harvey H. Daniel, 830 West Fifty-fifth street.

CHICAGO. — Marquette Electric Engineering Co. has been incorporated to manufacture electric machinery and supplies; $15,000 capital stock; Edwin A. Fritsch, Hugh Fritsch and Adolph C. Anderson, 625 Greenwood avenue.

CHICAGO.—Paterson and Davidson, engineers, 53 West Jackson boulevard, are having plans prepared for a factory and power plant, 80 x 500 feet, two stories, for a client whose name is withheld. Contract will be let about Aug. 1.

CHICAGO.—Colles Heater & Specialty Co. has been incorporated to manufacture feed water heaters and hot water generators; $2,500 capital stock; by Simeon K. Dickerson, Lily M. Dickerson and Ewart H. Bolton, 37 West Van Buren street.

CHICAGO.—Bids will be asked shortly on the second section of the Morrison hotel, Madison and Clark streets, 21 stories, of steel construction, with brick and terra cotta. Marshall & Fox, 38 South Dearborn street, are architects.

CHICAGO.—Chas S. Frost, architect, 105 South La Salle street, has prepared plans for the city recreation pier at the foot of Grand avenue. This is to be 600 feet long, 240 feet wide, two and three stories, with towers, of steel frame with brick and terra cotta finish. The cost will be $150,000.

CHICAGO.—Plans are being prepared by A. S. Alschuler, 28 East Jackson boulevard, for a $55,000 warehouse and factory, 2 stories, 110 x 248 feet, to be located in the Central Manufacturing District. It will be occupied by the Oppenheimer Casing Co., 76 West Monroe street.

NEW ATHENS, ILL.—Bids are being received for a 2-story warehouse, 60 x 100 feet, for the Auto Stove Co. Reister & Rubach, 414 Missouri avenue, East St. Louis, Ill., are architects.

QUINCY, ILL.—Paramount Stove Works has been incorporated to manufacture stoves and furnaces; $40,000 capital stock; by John Hoover, A. J. Tansman and H. F. Miller.

BAY CITY, MICH.—Bids will be asked shortly for the new plant of the Kuhlman Electric Co., Elkhart, Ind., 48 x 210-foot, L-shaped; this concern will move to Bay City during the first half of July; Pratt, Bickel & Campbell, architects.

DETROIT.—Ford Motor Car Co. has put out an inquiry for a 10-ton crane.

DETROIT.—Reiss, Ball & Co. has been incorporated to manufacture and deal in vehicle bodies, metal stampings, metal and woodwork products; $5,000 capital stock; by Joseph Reiss, Albert Ball and Frederick Stander.

DETROIT.—Detroit Automatic Door Opener Co. has been incorporated to manufacture a device to automatically open and close doors; $2,000 capital stock; by Albert Russell, Albert Ives, Harry Holland and others.

DETROIT.—Louis Kamper, 702 Fine Arts building, is completing plans for a hospital

Tip-Top Tips

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To you, Mr. Seller.

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Republic Iron & Steel Co., Youngstown, O., soon will let contracts for power house equipment, to cost about $300,000.

Plans are being drawn for a 3-story, 80 x 400-foot, Kahn system reinforced concrete building to be added to the plant of the Packard Motor Car Co., Detroit. It is understood the building will be devoted to the manufacture of motor trucks.

Utah Copper Co., 165 Broadway, New York City, is asking for bids on several machine tools.

General Electric Co., Schenectady, N. Y., is inquiring for 42 lathes.

American Car & Foundry Co., Chicago, is inquiring for equipment for making shrapnel.

Ford Motor Car Co., Detroit, has put out an inquiry for a 10-ton crane.

for the city, 55 x 294 feet, seven stories, steel construction, to cost $400,000.

HARTFORD, MICH.—Hartford Light & Power Co. has been organized to assume control of the property of the Anderson Brothers company and will install a new generator and other equipment shortly.

SAGINAW, MICH.—Cowles & Mutscheller, architects, 1 Chas block, will take bids shortly for a storage building, 88 x 96 feet, 6 stories, reinforced concrete, for the Saginaw Beef Co.

SAGINAW, MICH.—Nelson Bros. Co. is about to erect a factory building, one-story and basement, 90 x 100 feet, with a wing 90 x 90 feet, to be used for the manufacture of gasoline engines, jacks and feed grinders.

SAGINAW, MICH.—City clerk will receive bids until April 20 for paving certain streets with creosote wood block; work shall not commence later than June 1, and be completed Oct. 30.

BELOIT, WIS.—Wisconsin Utility Commission has authorized the Beloit Water, Gas & Electric Co. to issue $100,000 in bonds for extensions and improvement work, R. G. Krumrey, Beloit, is general superintendent.

GREEN BAY, WIS. — Wisconsin Public Utility Service Co., C. A. Ewing, Green Bay, chief engineer, is considering construction of a $300,000 hydro-electric plant at Johnson Falls this year.

GREEN BAY, WIS.—Sectional Roll Co., Green Bay, manufacturing machinery and equipment for woodworking plants, has increased its capital stock from $25,000 to $50,000 and intends to purchase considerable new equipment for the enlargement of its output. Alexander Roberts is president.

KENOSHA, WIS.—Plans will be ready June 1 for a pumping station and lake intake, M. Scholey, mayor.

MERRILL, WIS.—The recently organized Northern Wood Products Co. of Merrill, capital stock, $50,000, has acquired the plant and business of the Lee Handle & Dowel Co. and will add several other hardwood-working lines. It is planned to install more equipment and later erect an addition. The officers are: President, Clinton R. Lee, Lincoln, Neb.; vice president, H. B. White, Spencer, Ind.; secretary-treasurer, W. A. Thomas, Merrill; superintendent, W. E. Helms.

MILWAUKEE. — Badger Crushed Gravel Co. has been incorporated in Milwaukee, by J. D. Cantwell, E. I. Weiland and Maurice A. McCabe, attorney, and intends to fit up a large quarry and gravel pit holding near Milwaukee. The capital stock is $35,000.

MILWAUKEE.—Alfred C. Clas, architect, Milwaukee, is completing plans for a 4-story, 66 x 200-foot, brick and stone, wholesale grocery house for Gould, Wells & Blackburn Co. at Madison, Wis., to replace a structure recently destroyed by fire. Spiral gravity chutes, one electric freight elevator and one passenger elevator will be required.

DES MOINES, IA.—Work will start on a central heating plant about July 1 if a franchise can be secured and other preliminary arrangements can be disposed of before the middle of June, according to the Des Moines Electric Co.

LARCHWOOD, IA.—Bids will be received until April 21 for an electric lighting system, including an oil engine, generator, storage battery, etc. Earl D. Jackson, St. Paul, is consulting engineer; W. F. Ashton, town clerk.

SIOUX CITY, IA.—E. E. Hosmer, county auditor, is having plans prepared for a court house, 150 x 150 feet, six stories, of steel and stone.

SIOUX CITY, IA.—Central Machine Works & Auto Co., a new corporation, has taken over the business of Morris & Reid, operating as the Central Machine Works, doing machine shop work and automobile repairing.

WATERLOO, IA.—Moore Mfg. Co. has

been incorporated to manufacture tanks, culverts, portable buildings, etc., of sheet iron, copper and tin; $10,000 capital stock; E. L. Moore, president and general manager; W. M. Hogan, vice president; U. G. Kramer, secretary and treasurer.

MANKATO, MINN. — Mayer Bros. Co., which is having plans drawn for a machine shop 80 x 400 feet, will include an electric traveling crane in its equipment. Louis L. Mayer, general manager.

MINNEAPOLIS.—Minnesota Fiber Bottle Co., is to build a 3-story factory at 65 Twenty-second street, N. E., estimated to cost $30,000.

ST. PAUL.—Henry Havighorst is having plans prepared for a hotel building 80 x 80 feet, seven stories, of steel and reinforced concrete, to cost $150,000.

WINDOM, MINN.—General contract has been let to J. G. Robertson, University and Eustis streets, St. Paul, for an electric light plant and equipment costing $25,000, for the village of Windom. W. M. Hale is clerk.

WINONA, MINN.—Winona Foundry Co. is about to expend $5,000 for a new foundry and equipment.

SOUTHERN STATES

NORFOLK, VA.—George W. Duvall & Co. has been incorporated to conduct an iron foundry; $50,000 to $75,000 capital stock; James A. Ridgewell president; Arthur J. Hall, secretary-treasurer, both of Norfolk.

PORTSMOUTH, VA.—Fire badly damaged the machine shop and blacksmith department of the Seaboard Air line railroad shops in Portsmouth.

DURHAM, N. C.—Mayor and board of aldermen will receive bids until 3 p. m., April 21 for pumping station equipment consisting of 3,000,000-gallon crank and flywheel pumping engines, turbine driven centrifugal pumps, feed pumps, open feed water heaters, 5-kilowatt and 7½ kilowatt direct current electric lighting units and Manning boilers.

PLYMOUTH, N. C.—City will vote May 4 on $12,000 bonds to construct an electric light system.

UNION, S. C.—W. Newell Smith Auto Co.'s garage damaged by fire; heavy loss on machine tools.

COWETA, GA.—Coweta Mfg. Co., farming implements, has been incorporated; $25,000 capital stock; by C. D. Manley, Garland M. Jones and M. Y. Manley.

MACON, GA.—Citizens have voted $150,000 in bonds for a municipal hospital.

MACON, GA.—Macon Terminal Co. has petitioned the Georgia railroad commission for permission to build a $1,500,000 union passenger station.

QUITMAN, GA.—Quitman Foundry & Machine Co. suffered about $5,000 damage by fire.

BIRMINGHAM, ALA.—C. Schumacher, Anniston, Ala., who constructed the white way in Birmingham and other cities, said that his firm is figuring on the erection of an additional foundry to its plant in Anniston.

DALLAS, TEX.—W. A. Parker has organized a company to build an electric light plant at Montague, Texas.

FLORESVILLE, TEX.—Floresville Light & Power Co. has just been organized and has obtained a franchise for an electric light and power plant to cost about $13,000.

PALESTINE, TEX.—Texas Power & Light Co. has plans prepared for an $80,000 electric light and power plant in Palestine. C. A. Martin, Palestine, is manager.

SAN ANTONIO, TEX.—San Antonio Foundry Co. has been incorporated; $30,000 capital stock; by C. E. Dilley, C. V. Dilley and N. M. Karney.

VICTORIA, TEX.—The city council is about to appropriate money for a municipal electric light plant, to cost about $40,000.

NEWPORT, ARK.—Arkansas Power Co., Arkadelphia, has bought the property of the Co-operative Electric Light Co. and improvements costing $25,000 are being planned. W. C. Maguire, Arkadelphia, is manager.

STUTTGART, ARK. — Messrs. Wilbur & Sowell are at the head of a project to establish a 100-ton rice paper mill, to cost about $300,000, in Stuttgart by Oct. 1.

BRISTOL, TENN.—Bristol Brick Co. is planning to increase its equipment; A. C. Honaker, Abingdon, Va., is president.

COOKEVILLE, TENN. — The quarterly court has appropriated $50,000 for the equipment of the state polytechnic institute which has been located in Cookeville by act of the legislature.

CROSSVILLE, TENN.—Cline & Burnett are buying power and special equipment for a beer stave mill, which will be located in Crossville.

JOHNSON CITY, TENN.—W. J. Barton, president, chamber of commerce, heads a project for the establishment of a large woodworking factory.

MARTEL, TENN.—Bolinger Bros. will need power and special equipment for a saw and planing mill which they will erect.

JENNINGS, OKLA.—Gate Electric Light & Power Co. has been incorporated; $5,000 capital stock; by William E. May, Herbert Crowley, Bartlesville.

OKLAHOMA CITY.—Economy Light & Mfg. Co., has been incorporated; $30,000 capital stock; by W. M. Cloninger, Kingfisher, Okla.; B. L. Halk and Al Shank, Oklahoma City.

POTEAU, OKLA. — Poteau Foundry & Machine Co. has been incorporated; $25,000 capital stock; by Costello C. Clinton, Calhoun, Okla.; Frank E. Tyler and C. Whalen, Kansas City.

TULSA, OKLA.—Maloney Tank Co., manufacturer, Sapulpa, Okla., has purchased property in Tulsa and will erect an 89 x 190-foot building.

WESTERN STATES

OMAHA, NEB.—Thos. R. Kimball, architect, 503 McCague building, is taking bids for a $300,000, 8-story building, 66 x 132 feet, for the Omaha *World-Herald*.

OMAHA, NEB.—George B. Prinz, 1033 Omaha National Bank building, has prepared plans for a $500,000 board of trade building, 10 stories, 66 x 132 feet.

OMAHA, NEB.—Crown Cork & Seal Co., Eleventh and Harvey streets, is receiving bids through George Prinz, 1033 Omaha National Bank building, for a warehouse and office building, 5 stories, 40 x 132 feet, to be occupied by the Otis Elevator Co.

OMAHA, NEB.—Bids are being taken for a warehouse, factory and office building, 62 x 32 feet, three stories, to cost $60,000. Geo. B. Prinz, 1,033 Omaha National Bank building, is architect and L. G. Doup, 1,301 Nicholas street, is owner.

LINCOLN, KAN. — Lincoln Transfer & Storage Co. is planning to build a $15,000 warehouse, 100 x 120 feet.

PRATT, KAN.—Bids will be taken until April 20 by M. P. Jones, city clerk, for an electric light and power plant including 160 and 240-horsepower steam engines, two 72-inch x 20-foot oil burners and 125 and 187 K. V. A. alternators, 27 transformers and other equipment.

TOPEKA, KAN. — Rehkopf Brothers, 209 West Sixth street, are having plans prepared by L. M. Wood, for a $15,000, 3-story factory, 50 x 100 feet.

GLENDIVE, MONT.—City Engineer Hanford recommends a high-pressure pump for water department with a capacity of 850 gallons per minute at an estimated cost of $1,450.

DUBOIS, WYO.—Lander Electric Light & Power Co., Lander, Wyo., is planning to build an electric generating station and distribution system at Dubois. E. D. Edwards, Lander, is secretary and treasurer.

LORDSBURG, N. M.—Lordsburg Water, Ice & Electric Co. is to install equipment in its electric light and power plant.

SALT LAKE CITY.—Knight Sugar Co. is taking preliminary steps toward building a $450,000 factory; E. F. Dyer is interested.

KELLOGG, IDA.—Stockholders of the Amy Matchless property located on Pine creek, near Kellogg are considering the erection of a 50-ton mill, to cost about $16,000.

LEWISTON, IDA. — Lewiston, Nez Perce & Eastern Railway Co. has been incorporated by Z. A. Johnson and others with a view of constructing a railroad from this place to Nez Perce, also several branches.

ABERDEEN, WASH.—I. W. Mason, inventor of a mirror level patent, has formed a company which is considering the erection of a plant for the manufacture of the device.

HOQUIAM, WASH.—City will construct a bridge across the Hoquiam river, to cost about $45,000; C. E. Fowler, Central building, Seattle, is the engineer.

BREMERTON, WASH.—Burnett Construction Co., 909 Second avenue, Seattle, has been awarded a contract by the Gas Service Corporation, Leary building, Seattle, for the construction of a $100,000 gas plant in Bremerton.

COLVILLE, WASH. — W. H. Linney, Spokane, has acquired the Old Dominion properties and has organized the Dominion Silver Lead Mining Co. with a capital stock of $100,000. About $25,000 will be spent in reopening the underground works; concentrators, air compressors, pumps, hoists and conveyors are to be installed.

MILES, WASH.—Big Bend Transit Electric Railway, which is intended to run from Spokane along the Spokane river to its junction with the Columbia, has filed with C. O. Upchurch, agent for former Spokane Indian reservation, maps and plans for a line from Spokane to Miles.

MONTESANO, WASH.—Gas Service Corporation, Leary building, Seattle, has awarded a contract to the Burnett Construction Co., 909 Second avenue, Seattle, for the construction of a $50,000 gas plant in Montesano.

SEATTLE.—The state utility commission has recommended an appropriation of $25,000 for an additional boiler at the municipal power plant to increase the output to 10,000 kilowatts.

SEATTLE.—Proposals and competitive designs will be received until May 3 for furnishing and installing electrical fixtures in the King county court house; plans are on file with the county commissioners. Cost will be about $25,000.

SEATTLE,—Board of public works is soon to call for bids on a timber and steel drawbridge over the Duwanish waterway on Eighth avenue south, to cost about $45,000. The Puget Sound Traction, Light & Power Co. has agreed to pay one-third of the costs.

SEATTLE.—Washington Securities Co., 313 Crary building, has taken out a permit for the construction of its 10-story, steel frame office building at 1906 Third avenue, to cost about $400,000; Frank Allin, architect; M. J. Hurson Co., builders.

TEKOA, WASH.—DeSmet Valley Co., recently incorporated for $50,000 by J. Y. Waller and others, contemplates the erection of a sawmill.

WALLA WALLA, WASH.—County commissioners will receive bids until May 5 for

the construction of a $150,000, reinforced concrete court house. Osterman & Siebert, architects.

WENATCHEE, WASH.—It is reported J. P. Graves and associates of Spokane, who control the Holden mine on Lake Shelan, will build 26 miles of railroad at a cost of about $20,000 a mile and will erect a smelter.

CANYON CITY, ORE.—F. S. Slater and Neil Niven are to install drills and air compressor in the mine which is being worked by the Utah-Oregon Gold Mining Co.

PORTLAND, ORE.—James P. Taylor, Macleay building, has been awarded a contract for erecting a building for the Coin Machine Co., on Alice street, at a cost of about $30,000; T. J. Potter, Corbet building, is president of the machine company.

SALEM, ORE.—Hunt Brother will install boilers of 100-horsepower capacity at their cannery.

SILVERTON, ORE.—It is reported the Silverton Lumber Co. will install an electric tractor system at the mill docks.

OAKLAND, CAL.—Plans are completed for a $30,000 addition to the auxiliary salt water fire protection system. Frank M. Smith is city clerk.

REDONDO, CAL.—Citizens have voted to issue $121,000 in bonds for a municipal pleasure pier.

SAN FRANCISCO.—Trustees of Leland Stanford University have authorized a $20,000 addition to the power house.

SAN FRANCISCO.—Santa Barbara Gas & Electric Co. will spent $50,000 this summer in enlarging its plant, increasing the output capacity to 1,500,000 cubic feet of gas daily.

SAN FRANCISCO.—Machine Works & Supply Co. has been incorporated to manufacture pumps, engines and machinery; $100,000 capital stock; by W. W. Price, D. O. Marks, J. L. Sebastian.

BATTLE MOUNTAIN, NEV.—A movement is on foot to establish an electric power plant in Battle Mountain. H. R. Lemain, H. E. Christensen and St. Claire Moore are the promotors.

New Trade Publications

STEAM TRAPS.—A 16-page booklet describing various types of steam traps has been issued by the Automatic Steam Trap & Specialty Co., Detroit. The booklet includes some useful steam trap data in addition to the purely descriptive matter.

BOILER FITTINGS.—The Lagonda Mfg. Co., Springfield, O., has published a booklet entitled, "Lagonda Boiler Room Specialties." This booklet describes and illustrates several types of boiler tube cleaners with latest improvements and boiler quick repair tools. It also covers automatic cut-off valves and multiple strainers.

PIPE COVERING.—The Armstrong Cork & Insulating Co., Pittsburgh, has issued an interesting 4-page folder describing a new form of high pressure covering for pipes, furnaces, boilers, etc., which is made of diatomaceous earth and asbestos. It is said to contain no cork whatever and to have unusual heat insulating properties.

SHEET METAL PRODUCTS.—A handsomely illustrated catalog has been issued by the Parkersburg Iron & Steel Co., Parkersburg, W. Va. The line of sheet metal products manufactured by this company is described in detail. A portion of the catalog is devoted to a description of stove pipe manufactured by the Budke Mfg. Co., Parkersburg.

FLEXIBLE SHAFTS.—In bulletin No. 54 the Stow Mfg. Co., Binghamton, N. Y., describes a two-spindle electric-driven portable drill, together with two forms of buffing and grinding machines. The suspended type grinding machine, which is illustrated in the bulletin, is driven by an electric motor of special design, the power being transmitted to the wheel through a flexible shaft.

CENTERING MACHINE.—A bulletin has been issued by the Binghamton Machine Works, Binghamton, N. Y., illustrating and describing an improved centering machine manufactured by this concern. It is said that this tool is so constructed that the drilling and reaming is done at one operation. A positive stop is provided to prevent countersinking too deeply.

MINE TIES.—The Cambria Steel Co. has issued a booklet covering the Slick steel mine tie which was described and illustrated in *The Iron Trade Review*, July 9, 1914. The booklet includes a large number of tables giving the weights and dimensions of the Slick ties, together with illustrations showing the ties in service in mines. Tables covering the properties and principal dimensions of standard T-rails and splice bars for mine and industrial also are presented.

THE SCIENTIST.—"The Scientist" is the title of a house organ published by the Goheen Mfg. Co., paint engineers, Canton, O. The uses of paints are discussed at length from a scientific standpoint and in the March number of this interesting publication the shop coating of iron and steel, the painting of steel cars and the waterproofing and dampproofing of concrete is considered in all of its various phases. A binder is furnished gratis for this house organ of a sufficient size for 12 numbers.

FRICTION CLUTCHES.—A catalog recently issued by the Hilliard Clutch & Machinery Co., Elmira, N. Y., describes and illustrates a new form of clutch for the transmission of power between sections of shafting. The two friction plates are drawn against the friction ring which contains a number of hardwood inserts. The necessary contact between the plates and the ring is secured by means of worm threaded studs operated by spiral gears which mesh with racks attached to a sliding collar.

AIR COMPRESSORS.—A 32-page bulletin has been issued by the Ingersoll-Rand Co., 11 Broadway, New York, describing various types of portable air compressor outfits driven either by electric motors or gasoline engines. These outfits are said to have a wide range of usefulness. Two general types are manufactured for indoor and outdoor service respectively. The indoor types, which are intended for use in foundries, machine shops, etc., generally are driven by electric motors. Gasoline engines usually are employed for driving the outdoor compressors.

ELECTRIC FURNACE BULLETIN.—A handsomely illustrated, 24-page bulletin has been issued by the Snyder Electric Furnace Co., Chicago, which is devoted to the Snyder furnace and shows various installations of this steel-refining medium. Not only is the furnace described in detail, but the method of making steel by this process also is discussed. Another booklet also issued by this company is entitled "A Better Steel at a Cost Lower Than Open Hearth for Equal Tonnages." The merits of the Snyder furnace are pointed out briefly with comparisons of its efficiency with open hearth furnaces.

AIR HOISTS.—A 16-page bulletin covering air hoists of various types has been issued by the Northern Engineering Works, Detroit. The hoists manufactured by the Northern works are provided with an improved adjustable valve which combines the inlet and exhaust functions in one body, together with provisions for speed adjustment, cut-off and a safety check. The bulletin contains descriptions, illustrations and tables of dimensions covering vertical, horizontal and telescopic types of hoists. Compressed air jacks, pneumatic foundry elevators and pneumatic jib and traveling cranes also are described.

GRAVITY CONVEYORS.—The Mathews Gravity Carrier Co., Ellwood City, Pa., has issued a 32-page catalog describing its standard equipment. This company builds gravity conveyers of the roller type, designed for rapidly and economically handling material in shops, factories, warehouses, etc. The conveyers are built in either straight or curved sections to fit any shop condition. The company also manufactures automatic elevators and incline elevators for lifting material from one level to another. The catalog includes complete descriptions of the conveyers and elevators with illustrations showing details and typical installations.

PIPE BENDING MACHINE. — Bulletin No. 5,001, issued by the Hydraulic Press Mfg. Co., Mount Gilead, O., describes a 30-ton hydraulic pipe bender which recently has been placed on the market by this concern. The ram of the press is forced downward by a hand-operated pump with a plunger diameter of ⅝-inch and a stroke of 3½ inches. The pump is equipped with a ½-inch safety valve and a ½-inch tee screw operating valve. The reservoir is a part of the pump. Although the press is designed primarily for bending pipe of various sizes, it is also adapted for the miscellaneous bending work which comes up in machine, railroad and automobile shops. By the use of bending blocks, pipe up to 4 inches in diameter can be handled.

BRUSHES, BROOMS AND FOUNDRY SUPPLIES.—The extensive line of brushes, brooms, foundry supplies and hardware specialties manufactured by the Osborn Mfg. Co., Cleveland, is illustrated and described in a 302-page catalog recently issued. To facilitate the insertion of revised sheets the catalog is bound in a loose-leaf binder. The line of brushes and brooms illustrated is exceedingly extensive and includes practically every conceivable type for almost every purpose. Practically every type of molder's brush is made, as well as casting brushes, both hand and wheel. Brushes, polishing and buffing wheels also are made for use in polishing and plating departments. The line of foundry supplies in addition to brushes, brooms, etc., includes wire cloth, bellows, shovels, sprinkling cans, rammers, sprues, mallets, spray cans, torches, sand sifters, etc. A line of brushes also is shown for use in the pattern shop, including glue and paint brushes, etc. The catalog is unusually complete and should prove a valuable addition to the trade literature of every manufacturing plant.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to July 1.)

Bessemer, valley	$13.60
Bessemer, Pittsburgh	14.55
Basic, Pittsburgh	13.45
Basic, eastern Pa.	13.25 to 13.50
Malleable, Pittsburgh	13.45 to 13.95
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.50 to 13.00
No. 1X foundry, Philadelphia	14.54 to 14.79
No. 2 foundry, Pittsburgh	13.45 to 13.95
No. 2 foundry, valley	12.50 to 13.00
No. 2 foundry, Cleveland	13.25
No. 2 foundry, Ironton	12.75 to 13.00
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.29 to 14.54
No. 2X fdy., N. J. tidewater	14.25 to 14.50
No. 2X foundry, Buffalo	12.50 to 13.00
No. 2 plain, Philadelphia	14.00 to 14.25
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.25 to 12.50
No. 2 southern, Birmingham	9.25 to 9.75
No. 2 southern, Cincinnati	12.15 to 12.65
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	13.75 to 14.00
No. 2 southern, Cleveland	13.25 to 13.75
No. 2 south'n, New York docks	13.50 to 13.75
No. 2 southern Boston docks	13.50 to 13.75
No. 2 south. interior, New Eng.	14.25 to 15.25
No. 2 southern, St. Louis	12.90 to 13.40
Virginia No. 2X furnace	12.50
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virginia 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.45
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	14.75 to 15.25
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

(Prices nominal.)

Foreign Bess., 50 to 65 per cent.	7½c to 8½c
For'n non-Bes., 50 to 65 per cent	7½c to 8½c

COKE

(At the ovens)

Connellsville furnace	$1.55 to 1.60
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy. contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-mang., Balti. (prompt)	$90.00 to 100
Ferro-mang. (future), Balti	78.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent	19.00
Ferro-sil., 11 to 12 per cent	18.00
Ferro-sil., 10 to 11 per cent	17.00
Ferro-sil., 9 to 10 per cent	16.00

(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville)

Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$21.56 to 22.56
Forging billets, Phila.	24.56 to 25.56
Forging billets, Pbgh.	24.00 to 24.50

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.639
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Rates on sheet mill products $2 per ton higher.

Wire rods, Pittsburgh	$25.00 to 26.00
Billets, Pittsburgh	19.50 to 20.50
Billets, Youngstown	18.50 to 19.50
Sheet bars, Pittsburgh	20.00 to 21.00
Sheet bars, Youngstown	19.00 to 20.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect, Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.15c to 1.20c
Structural shapes, Chicago	1.39c
Structural shapes, Philadelphia	1.259c to 1.359c
Structural shapes, New York	1.269c to 1.369c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.29c to 1.39c
Tank plates, Pittsburgh	1.10c to 1.20c
Tank plates, Philadelphia	1.309c to 1.359c
Tank plates, New York	1.319c to 1.369c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.39c
Bars, soft steel, Philadelphia	1.309c to 1.359c
Bars, soft steel, New York	1.319c to 1.369c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Bands, Pittsburgh	1.15c
Shafting, Pbgh., carloads.	68 to 70 per cent off
Bar iron, Chicago	1.15c
Bar iron, Philadelphia	1.125c to 1.175c
Bar iron, New York	1.125c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.90c
No. 28, black, Chicago	1.94c to 1.99c
No. 28, tin mill, black, Pbgh.	1.85c to 1.90c
No. 28, galvanized, Pbgh.	3.30c to 3.40c
No. 28, galvanized, Chgo.	3.59c
No. 10, blue, annealed, Pbgh.	1.30c to 1.35c
No. 10, blue, annealed, Phila.	1.459c to 1.509c
Tin plate, 100 lb., coke base	3.20c to 3.35c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll. and re-anl.	30 cents
Hot roll'd pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	80	69½
Iron, ¾ to 2½ inches	70	59
	Lap-weld.	
Steel, 2½ to 6 inches	79	68½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	75
Iron, 3½ to 4½ inches c. l.	60

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails, jobbers, Pittsburgh	$1.60
Plain wire, jobbers, Pittsburgh	1.40
Galvanized wire, jobbers, Pbgh.	1.90
Polished staples, Pbgh.	1.60
Galvanized staples, Pbgh.	2.10
Barb wire, painted, jobbers, Pbgh.	1.60
Barb wire, galv., jobbers, Pbgh.	2.10

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 10; cut threads 80 and 15; larger or longer, 75 and 17½.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled 80 and 20; cut, 80 and 15; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85 and 2½.

Hot pressed square, blank or tapped nuts. $6.40 off list; hot pressed hexagon blank or tapped, $7.30 off.

Cold pressed, square, blank or tapped, $6.10 off; hexagon, blank or tapped, ⅝ inch and larger, $7.50; ⅞-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length Hard.	Soft.
1½ inch and wider	2.85	3.10
0.100 and thicker	2.95	3.20
0.050 to 0.099 inc.	3.10	3.35
0.035 to 0.049 inc.	3.35	3.75
0.031 to 0.034 inc.	3.60	4.00
0.025 to 0.030 inc.	3.80	4.20
0.020 to 0.024 inc.	4.70	5.20
0.017 to 0.019 inc.	5.10	5.60
0.015 and 0.016	5.95	6.45
0.013 and 0.014	6.55	7.05
0.012	6.90	7.40
0.011	7.25	7.75
0.010	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Six to 48-in., Cleveland	23.75
Four-inch, Chicago	26.00
Six to 12 inches, Chicago	24.00
Large sizes, Chgo	23.00
Six-inch, New York	20.50 to 21.50
Four-inch, New York	21.50 to 22.50
Four-inch, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.60c to 1.65c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.55c to 1.60c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.60c to 1.65c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 28 black sheets, Chgo	2.55c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	3.75c
No. 28 galv. sheets, Cleveland	3.50c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.75c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 8.50 to 9.00
No. 1 railroad wrought, Cleve	9.75 to 10.00
No. 1 railroad wrought, St. L.	8.00 to 8.50
No. 1 railroad wrought, Cincin.	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.25 to 8.50
No. 2 railroad wrought, St. L.	7.50 to 7.75
Arch bars and transoms, Chgo	11.50 to 12.00
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. & spr'gs, Chgo.	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L.	8.25 to 8.50
Shafting, Chicago	11.25 to 11.75
Shafting, St. Louis	11.00 to 11.50
Steel car axles, Chicago	10.50 to 11.00
Steel car axles, St. Louis	10.00 to 10.50
Locomotive tires, Chicago	8.50 to 9.00
Locomotive tires, St. Louis	9.00 to 9.25
Cut forge, Chicago	8.25 to 8.75
Pipes and flues, Chicago	6.50 to 6.75
Pipes and flues, Cleveland	7.25 to 7.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	6.00 to 6.50
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00 to 10.50
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	9.00 to 9.25
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	7.00 to 7.25
No. 2 busheling, Chicago	6.25 to 6.50
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut, St. L.	5.50 to 5.75
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.00 to 5.25
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	4.75 to 5.25
Machine shop turnings, Chicago	5.00 to 5.50
Machine shop turnings, Cleve	5.75 to 6.00
Machine shop turnings, Cinci	$ 4.75 to 5.25
Machine shop turnings, St. L.	5.25 to 5.75
Malleable agl., Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	6.00 to 6.50
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	7.00
Malleable, railroad, St. Louis	6.50 to 7.00
Angle bars, iron, Chicago	11.25 to 11.75
Angle bars, iron, St. Louis	9.50 to 10.00
Angle bars, steel, Chicago	8.25 to 8.50
Angle bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	7.75 to 8.00
Stove plate, Cleveland	8.00 to 8.50
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	6.50 to 6.75
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh	$12.00 to 12.25
Heavy melting steel, Buffalo	10.25 to 10.75
Heavy melting steel, Chgo	9.25 to 9.50
Heavy melting steel, Cleveland	10.25 to 10.50
Heavy melting steel, Cincinnati	9.00 to 9.50
Heavy melting steel, eastern Pa.	11.00
Heavy melting steel, New York	8.75 to 9.00
Heavy melting steel, St. Louis	9.50 to 10.00
Bundled sheet, Buffalo	7.00 to 7.50
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	12.50 to 13.00
No. 1 railroad wrought, Pbgh	10.25 to 10.75
No. 1 R. R. wght., New York	10.50 to 11.00
No. 1 R. R. wrought, Buffalo	10.00 to 10.50
Shafting, New York	12.50 to 13.00
Shafting, eastern Pa.	15.00 to 15.50
Wrought pipe, New York	8.00 to 8.25
Wrought pipe, eastern Pa.	10.25 to 10.50
Mch. shop turnings, New York	6.25 to 6.50
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh	7.75 to 8.00
Mch. shop turnings, eastern Pa.	8.25 to 8.75
Cast borings, New York	5.75 to 6.25
Cast borings, eastern Pa.	8.00 to 8.50
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.25 to 8.50
Stove plate, N. J. points	8.50 to 9.00
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa.	9.00 to 9.50
Shoveling steel, Chicago	8.75 to 9.50
Shoveling steel, St. Louis	8.00 to 8.50
Reroll'g rails, 5 ft. & ov., Pbgh.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., Chgo.	9.75 to 10.25
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	11.50 to 12.00
Reroll, rails, 5 ft. & ov., St. L.	9.25 to 9.75
Steel rails, short, Chicago	10.00 to 10.50
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.25 to 9.50
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo	11.50 to 12.00
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	13.50 to 14.00
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh	12.50 to 13.00
Frogs, switches, guards, Chgo	9.25 to 9.50
Frogs, switches & g'rds, St. L.	9.25 to 9.50
Car wheels, (iron), Pittsburgh	11.00 to 11.50
Car wheels, (steel), Pittsburgh	12.00
Car wheels, Chicago	9.75 to 10.00
Car wheels, eastern Pa.	10.75 to 11.25
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.25 to 9.50
Car wheels, St. Louis	10.00 to 10.25
Iron axles, Pittsburgh	17.50 to 18.00
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, Chicago	15.50 to 15.75
Steel car axles, New York	11.50 to 12.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa.	14.00 to 14.50
No. 1 busheling, Buffalo	7.50 to 8.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	5.25 to 5.75
Low phosphorus steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh.	13.75 to 14.00
Low phos. steel, eastern Pa.	14.00 to 14.50
No. 1 forge, eastern Pa.	8.50 to 9.00
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh	12.00 to 12.25
No. 1 heavy cast N. J. points	11.50 to 12.00
Mall. iron, R. R., Cleveland	10.25 to 10.50
Malleable railroad, Pittsburgh	10.00 to 10.25
Malleable R. R., Buffalo	9.50 to 10.00
Malleable, R. R., east Pa.	8.50 to 9.00
Bundled sheet, Pittsburgh	9.25 to 9.50
Bundled sheet, Cleveland (nom.)	7.75 to 8.25

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Electric Smelting of Ferro-Alloys

(*Continued from page 767*)

tion of the charge had been completed and allowed to act for 10 to 20 minutes. It was tapped from the furnace with the ferro-tungsten and the slag from reduction.

The alloys obtained, with two exceptions, were somewhat lower in tungsten than had been calculated, due to three causes: First, the presence in the furnace of iron due to hanging of a previous run with iron ore; second, the loss of tungsten in the slag; and, third, the iron reduced from the decarburizing slag. The carbon content of all of the alloys was low for ferro-tungsten, a condition clearly assisted considerably by the use of the decarburizing slag of iron oxide and lime. It was manifest that with a longer decarburization period the carbon in the alloy could have been reduced still further. The greater part of the manganese in the charge was either slagged or volatilized. The percentage of silicon was high in some of the products, but much lower when there was no iron ore in the charge. Phosphorus and sulphur were easily slagged in spite of a high percentage of both in the ore. The slags contained 4.66 to 8.64 per cent tungsten oxide (or 3.7 to 6.8 per cent tungsten), and ferrous oxide in about the same percentage. The commercial ferro-tungsten from the electric furnace contains 50 to 80 per cent tungsten and 0.5 to 4 per cent carbon.

During the experiments 32 pounds of ferro-tungsten was made, or an extraction of 83.8 per cent. The electrode consumption for the two experiments in which it was determined averaged 150 pounds per ton. This figure will be considerably reduced in large-scale operations. The average energy consumption for the seven experiments was 3.46 kilowatt-hours per pound tapped, or 0.79 kilowatt-year per ton. The ferro-tungsten was hard and brittle, and castings made from it were free from blowholes.

Conclusions drawn from the experiments are as follows: First, ferro-tungsten can be produced directly from ferberite in the electric furnace; second, by the use of a decarburizing slag before tapping the percentage of carbon in the alloy can be kept below 2 per cent; third, manganese, silicon, phosphorus, and sulphur do not enter the ferro-alloy in high percentages; fourth, the loss of tungsten in the slag need not be excessive; and fifth, the power consumption need not exceed 3.46 kilowatt-hours per pound of ferro-tungsten tapped, or 0.79 kilowatt-year per ton.

Electric Smelting of Vanadium

Most of the ferro-vanadium made is produced by the thermit process, by reduction of the oxide V_2O_5 in a crucible with carbon, or by reduction of vanadate of iron with carbon in a crucible. In Europe some ferro-vanadium is made by the reduction of the oxide, sulphide, or vanadate of iron with carbon in the electric furnace. The largest source of vanadium is the Peru deposit of patronite, a sulphide of vanadium containing about 60 per cent sulphur and 20 per cent vanadium. In Colorado and Utah there are large deposits of low-grade carnotite, a uranium and vanadium oxide mineral. Another ore found there is roscoelite, which contains vanadium oxide, but no uranium. The patronite ore is first roasted and then reduced by the thermit process; or in the electric furnace it may be directly reduced with lime as a desulphurizing agent and carbon as a reducing agent. The other ores are treated by chemical or ore-dressing processes to obtain the vanadium as oxide or vanadate of iron, and are then reduced with carbon in a combustion or electric furnace or by the thermit method. With oxides the electric furnace method is similar to the production of ferro-tungsten with carbon as a reducing agent. The sulphide reduction is similar to that of molybdenite with lime and carbon.

In several patented methods silicon is used as a reducing agent in the electric furnace. The process as performed in the electric furnace has no novel features beyond those stated regarding chromium, tungsten and molybdenum. Decarburization is with oxide of iron ore or oxide ore of vanadium. Vanadium is rather difficult to reduce, and as a result excess carbon is used which is absorbed up to about 6 per cent by the ferro-vanadium. The electric furnace product is made in 50 per cent and 25 per cent grades, with carbon varying from 1 to 4 per cent. Below are the results of analyses of these grades.

Constituent.	Grade with 50 per cent vanadium.	Grade with 25 to 30 per cent vanadium.
Vanadium	55.00	34.10
Iron	40.00	64.10
Carbon	4.00	1.42
Silicon	.30	.12
Aluminum	.10	.12
Manganese	.30	.12
Sulphur	.03	.03
Phosphorus	.04	.009

Vanadium acts like titanium as a cleanser and deoxidizer of a steel bath, and is also used to add as much as about 0.35 per cent vanadium to the steel itself. It is used after ferro-silicon and ferro-manganese have been added, so as to prevent loss, and cause deoxidation beyond the point obtained by these alloys. It melts without much difficulty and attacks the oxides present. Incorporated in the steel in proportions up to 0.30 per cent it toughens and adds a great tensile strength to the steel.

Pointers on Heat Treatment of Steel

(*Continued from page* 774)

length of time during which the temperature is stationary depends on the size of the bath and the rate of cooling, and is not a factor in the calibration. The true melting-point of salt is 801 degrees Cent. or 1,474 degrees Fahr., and the needed correction for the instrument under observation can be readily applied. The accompanying curves, Figs. 4 and 5, illustrate the calibration of a correct and incorrect pyrometer.

The cost of this equipment, including a coal-fired furnace, as shown in Figs. 1 and 2, five to seven barrels of hardening oil, one barrel of drawing oil, the tanks for holding these oils and a pyrometer, should be from $500 to $600. The equipment just noted is the one necessary for tempered gears. When case-hardened gears are heat-treated, there is necessary, in addition to this, case-carbonizing boxes and carbonizing compound, and depending upon the quantity of case-hardened gears to be treated, a second furnace may be necessary. It is thus seen that for case-hardened gears, the heat-treating equipment is more expensive than that required for tempered gears.

Heat-treated gears are bound to appeal to the progressive machine-tool builder. They will make possible the use of gears of smaller section, and while this may not be necessary from the standpoint of weight, as is the case with the motor-car builder, an economy of space is frequently desirable. Their greatest advantage is the elimination of repairs and replacements.

Investments in Iron River District

(*Continued from page* 764)

moving picture shows, interspersed to suit local conditions. For the Baltic and Caspian locations, arrangements have already been made with a lyceum bureau this season for a course of lectures and concerts. This officer also can conduct a night school which is in great demand at all mines by the immigrants who are anxious to read and write the English language.

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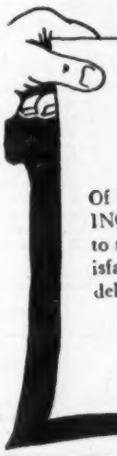
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Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

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Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Remittance should be made to cover eight (8) words for address if box number is used.

SAVE YOUR POSTAGE! When answering advertisements, simply address your replies in the usual manner and send to us for reforwarding under one cover.

Men Wanted

WANTED:—AN ACCOUNTANT, SALES manager, and a superintendent, who are willing to back their ability in the above departments, to the extent that they will subscribe to the capital stock of a successfully operated chilled plow factory. State in first letter experience, salary would expect and how much would invest. Heads of departments must be financially interested. This is not the ad. of an employment broker, but of factory's general manager. Address Box 385, THE IRON TRADE REVIEW, Cleveland, O.

MANGANESE STEEL FOREMAN: — A Western steel foundry wants man thoroughly familiar with manufacture of Manganese steel to take complete charge of that department. It is essential that the applicant has secured recent practical experience with one of the prominent Manganese companies. He should also be a chemist. Address Box 400, THE IRON TRADE REVIEW, Cleveland, O.

FOREMAN FOR FOUNDRY, ALSO machine shop. Men who will be permanent and who can take an interest in an old established plant, and invest from $2,000 to $5,000. We want permanent, high class men and want them interested, and will give to such an opportunity and liberal treatment in every respect. Address Box 401, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

UNDERSIGNED COUNSEL WILL CONfidentially negotiate preliminaries for important executive, technical, administrative and professional positions, insuring strictest privacy. Not an agency, but a highly-endorsed, high grade method of negotiating preliminaries only, for $3,000 to $12,000 men. Send address only for explanation. R. W. Bixby, Lock Box 134-E9, Buffalo, N. Y.

THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

Positions Wanted

YOUNG MAN DESIRES POSITION AS purchasing agent, cost accountant or organizer; would accept position as manager of small manufacturing plant; 12 years' experience in shop and office management. Address Box 327, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS GENERAL SUperintendent steel plant, open hearth or blooming mill; graduate Massachusetts Institute Technology in mechanical engineering and metallurgy; 17 years' experience; 8 years as assistant general manager steel corporation; open for engagement April 1; highest quality reference. For full particulars and interview Address Box 370, THE IRON TRADE REVIEW, Cleveland, O.

AGGRESSIVE, COMPETENT MAN, more fully qualified than ordinarily by seventeen years successful activity in the steel business, desires operating or executive rolling mill or foundry position requiring practical metallurgical producing, statistical, economic and financial knowledge. Address Box 396, THE IRON TRADE REVIEW, Cleveland, O.

CHEMIST: ENERGETIC, PROGRESSIVE and reliable; 19 years' experience in iron and steel laboratories. Excellent references, desires position at once. Address Box 383, THE IRON TRADE REVIEW, Cleveland.

AN EXPERIENCED SUCCESSFUL SUperintendent of Stove Works is open for position. Can mix iron by analysis and melt economically. Good at improving old line of patterns and planning new; of handling men and getting quality that builds trade. Address Box 393, THE IRON TRADE REVIEW, Cleveland, O.

MASTER MECHANIC WANTS POSItion; thoroughly experienced in constructing and operating rolling mills, open-hearth and blast furnaces; by-product coke ovens; water works, hydro-electric and turbo-generating plants; has machine shop practice; best references. Address Box 354, THE IRON TRADE REVIEW, Cleveland, O.

AS FOUNDRY FOREMAN; THORoughly experienced with 25 years stove, agricultural, gas engines, pump and brass. Will give efficient results. Address Box 397, THE IRON TRADE REVIEW, Cleveland, O.

PUBLICITY MANAGER—EXPERIENCED. Thoroughly familiar with mechanical and engineering subjects. Expert writer, advertiser and catalog maker. Address Box 389, THE IRON TRADE REVIEW, 90 West street, New York.

AN EXPERIENCED MOLDER, TECHnical graduate, would like to have a position where opportunity is for advancement. Address Box 325, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS FOUNDRY superintendent; thoroughly experienced in efficiency, production and scientific management, now available with A-1 references. Address Box 374, THE IRON TRADE REVIEW, Cleveland, O.

LABOR SUPERINTENDENT OPEN FOR position; years experience. Open hearth furnaces and gas producers; accept day or night position; can produce results. Address Box 384, THE IRON TRADE REVIEW, Cleveland, O.

MECHANICAL ENGINEER; TECHNIcal training; 18 years' experience gas engines, machine tools, mill buildings, hydraulic machinery, ordnance work; 14 years in charge of work; 6 years as superintendent; can fill position of superintendent or chief engineer; good references. Address Box 341, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

Opportunities

FOR SALE.

TURPENTINE—ROSIN PLANT. WOOD distillation. In Lake Charles, La. Wood, cheap, abundant. Sell half or all. Exceptional opportunity. Particulars, M. P. Erwin, Lake Charles, La.

FOR SALE: — FOUNDRY AND MAchine shop in Kansas City. Established 25 years. Doing $100,000 to $125,000 business yearly. One and one quarter acres land, brick buildings, located in the center of manufacturing district. Have practically a monopoly on architectural castings in this city, and making a large amount of machine castings. Can make very attractive price and terms. Address Box 378, THE IRON TRADE REVIEW, Cleveland, O.

FOR SALE: I WILL SELL TO AN established machine shop and foundry the rights to manufacture a superior line of small tool equipment. I also desire to become identified with company either as factory or sales manager. Have had 25 years experience. Price on the several patents offered $25,000. of which amount would take $15,000. in securities. The field is large and the tools possess great merit over anything of its kind ever manufactured and I can prove that same will be a profitable line to any concern that wants additional business and has the necessary capital to finance an article of merit. I prefer to deal direct with principals. Address Box 392, THE IRON TRADE REVIEW, Cleveland, O.

FOR SALE

The undersigned offers for sale the fabricating plant and fixtures of the Lehigh Valley Structural Steel Co., at Allentown, Pa.

The buildings are of steel construction with roofs and sides of glass and galvanized corrugated steel. Machinery and equipment is of the most modern type and has been used very little and is ready for immediate operation. The plant is ideally located—5 miles from Bethlehem Steel Works, 60 miles from Philadelphia, 90 miles from New York. Direct connections with Lehigh Valley Railroad, Philadelphia & Reading Railroad, Central Railroad of New Jersey and Lehigh Canal (all in yard) with very attractive freight rates. An exceptional opportunity for anyone desirous of going into the business of fabricating steel for buildings and bridges.

WILLIAM A. HAUSMAN
1142 Hamilton St. Allentown, Pa.

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We have in stock ready for immediate shipment the following Steam Hammers:

600 lb. Single Stand
1250 lb. Single Stand
2000 lb. Single Stand
2000 lb Double Stand

These are new hammers and complete with anvil block and dies. If interested a very attractive quotation will be given on application.

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